THE GAS JOURNAL

MARCH 28, 1934

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A Glance at the Contents—

Works Manager Required.

The position of Works Manager and Distribution Superintendent is advertised for by the Camborne Gas Company at a salary of £200. [p. 834.]

Meetings of Gas Companies.

Reports are published of the annual meetings of the European Gas Company, Ltd. [p. 826], and the British Gas Light Company, Ltd. [p. 828.]

Sir Arthur Duckham Memorial Fund.

The official list of donations to this Fund from March 17 to 23 is published. The donations either paid or promised at March 23 totalled £7,808. [p. 807.]

New Gas Showrooms at Stratford.

The Gas Light and Coke Company's 53rd showroom was opened last week at Stratford by the Member of Parliament for the Division. An interesting feature of the premises is the inclusion of a comprehensive industrial section. [p. 808.]

Future of the Industry.

In his Presidential Address to the Southern Association of Gas Engineers and Managers yesterday, Mr. Stephen Lacey suggested that the future of the Gas Industry depends upon the perfection of gas supply as regards quality and pressure, upon the appliances used, upon service, methods of charge, sales activities, and publicity. [p. 811.]

"Glycerin" Gas Drying Process.

Experiences of the "Glycerin" gas dehydration process at Luton are outlined by Mr. A. F. H. Knowles and Mr. R. Summerson. [p. 809.]

Manchester District Association.

The 64th Annual Meeting of the Manchester District Association of Gas Engineers was held at the Midland Hotel, Manchester, on Friday, March 23. [p. 822.]

Principles of Gas Lamp Design.

Our report of the discussion on the paper by Mr. L. T. Minchin—"Principles of Lamp Design"—before the London and Southern District Junior Gas Association commences on p. 824.

Church Floodlighting.

A fine example of floodlighting by gas was provided by the Gas Light and Coke Company in illuminating St. Anne's Church, Kew. An idea of the pleasing effect produced is given by our photograph on p. 813.

Removal of Sulphur from Gas.

The matter of sulphur removal from town gas was referred to by Mr. F. G. Shaw, of Buxton, in his Presidential Address to the Midland Association of Gas Engineers and Managers. Just over ten years ago he commenced oil washing for the removal of naphthalene, and he has improved the efficiency of extracting sulphur compounds in the one operation. [p. 815.]

Forthcoming Engagements

April 6.—NORTH BRITISH ASSOCIATION.—Spring Meeting at Perth.
April 6.—LONDON AND SOUTHERN JUNIOR ASSOCIATION.—Meeting. Paper by Mr. H. H. Brown.
April 7.—MANCHESTER AND DISTRICT JUNIOR ASSOCIATION.—Annual Dinner. Paper by Mr. H. Platt.
April 7.—SCOTTISH EASTERN JUNIOR ASSOCIATION.—Visit to Messrs. J. G. Stein & Co., Castle Carey. Paper by Mr. R. Malcolm.
April 9.—I.G.E.—Meetings of Finance Sub-Committee, 1.45 p.m.; Membership Sub-Committee, 2.30 p.m.; General Purposes Committee, 3.15 p.m.; Benevolent Fund Committee of Management, 4.30 p.m.
April 9.—GAS COMPANIES' PROTECTION ASSOCIATION.—Meeting of Committee, 5, Victoria Street, S.W. 1, 2.30 p.m.
April 10.—I.G.E.—Meetings of Council, 10 a.m.; Education Committee, 4 p.m.
April 10.—N.G.C.—Meeting of Central Executive Board, 28, Grosvenor Gardens, S.W. 1, 2.30 p.m.
April 10.—FEDERATION OF GAS EMPLOYERS.—Meeting of Central Committee, 28, Grosvenor Gardens, S.W. 1.
April 11.—I.G.E.—Meetings of Education Executive Committee, 10 a.m.; Sir Arthur Duckham Memorial Fund Executive Committee, 2.30 p.m.
April 12.—MIDLAND JUNIOR ASSOCIATION.—Meeting. Paper by Mr. F. H. Bate.
April 18.—B.C.G.A.—Meetings of Executive Committee 11.30 a.m.; General Committee 2.30 p.m., at 28, Grosvenor Gardens, S.W. 1.
April 19.—S.B.G.I.—Council Meeting at 2.30 p.m.
April 20.—B.C.G.A.—Annual Meeting of Salesmen's Circles, Caxton Hall.
April 30.—I.G.E.—Meeting of Liquor Effluents and Ammonia Sub-Committee, 2.30 p.m.
May 1.—I.G.E.—Meetings of Joint Research Committee, 10.30 a.m.; General Research Committee, 2.30 p.m.
May 9.—S.B.G.I.—Annual General Meeting and Dinner, Hotel Metropole, London.
May 10 & 11.—EASTERN COUNTIES GAS MANAGERS' ASSOCIATION.—Spring Meeting at Cleethorpes.
May 12.—SCOTTISH EASTERN JUNIOR ASSOCIATION.—Annual General Meeting and Paperette Day in Heriot Watt College, Edinburgh.
June 5-8.—I.G.E.—Annual General Meeting, London.

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Page 68. TORQUAY. C. G. Dawson, E. & M., resigned.

EDITORIAL NOTES

Local Publicity and the B.C.G.A.

As we have often emphasized in these columns, the success of the Industry must finally depend upon individual effort. Amalgamation and centralization constitute no excuse for any slackening in this respect, and we are glad that in his Presidential Address to the Manchester District Association of Gas Engineers last week Mr. F. G. Shaw, of Buxton, once again called attention to this axiom. "We are constantly, and rightly," he remarks, "urged to co-operate in various schemes and enterprises for the progress of the Industry. This I heartily support, but with one important reservation—there should be no reduction in individual effort."

To take a particular instance, the national work of the British Commercial Gas Association—work essential to the progress of the Industry—loses its force unless backed up enthusiastically by each undertaking. National publicity ought to be regarded as a background to specialized local propaganda, and in this regard Mr. Shaw puts forward a suggestion which certainly merits consideration. It is a truism that without the B.C.G.A. the Gas Industry would be in a very different position, a very much worse position than obtains to-day. There is no doubt that the Association has co-ordinated and stimulated local publicity; and one of the most gratifying features of its work during the past year is that the Association assisted in more schemes of local advertising than ever before. The more that individual undertakings are "up against it," the more they call upon the B.C.G.A.; and there could be no better means of driving home a selling argument than for undertakings to tie-up their own publicity with the national advertising schemes.

The point is, however, Could not this tying-up be made much more effective? Is sufficient attention being paid to district advertising? We have to remember two very important factors of publicity in the Gas Industry. The first is that publicity is a specialized business; the second that the conditions in different areas of supply vary enormously. The outlook of people in parts of the Durham coalfields, for instance, is by no means that of people on the outskirts of London. Again, in Yorkshire, the outlook varies from Riding to Riding. In brief, uniformly planned local publicity is not to be recommended. Mr. Shaw suggests either some measure of decentralization of the B.C.G.A.—the setting up of a branch office—or the appointment of a district advertising expert.

The idea of a district advertising expert should not be left merely as an idea if, as Mr. Shaw thinks, it "might lead to very general satisfaction." How would the scheme work out? We take it that in any one area where conditions of supply among the various undertakings are comparable, these undertakings would (*a*) provide the money for the expert—and we feel that undertakings would more readily find additional funds for a scheme of this nature which affected them directly than for other propaganda purposes of a more general and undefined nature—and (*b*) take his advice. The appointment of the expert would, we presume, be in the hands of the B.C.G.A., and would give general satisfaction. The expert would, by living for a time in the particular area, appreciate the type of sales resistance in that locality. He would know in what way the central organization, the B.C.G.A., could help in regard to actual local publicity material, and where special material was needed. Then the money for this special material or line of campaign would be found by the undertakings co-operating in the area. We do not know whether Mr. Shaw will agree with our working out of the scheme. If he does not, we hope he will give us his views.

As in many things, the success of the venture would stand or fall by co-operation or lack of it. Given co-operation, then we feel that the venture should be given a trial without delay. It certainly appears to hold out promise of success. As for the idea of a branch office of the B.C.G.A., this would, we think, resolve itself into a series of branch offices to such an extent as to nullify the strength of the Association to serve the Industry as a National Industry the claims of which must be put before the whole of the community.

There is another way in which undertakings in an area where conditions are comparable might get together with great advantage, and that is by interchange of showroom window displays. Frequent change of display is desirable, and it is also desirable that the displays themselves should be of a high standard. The motor 'bus services bring all in easy reach of shopping centres where goods are attractively displayed, and even dwellers in villages expect attractive showroom windows. Such displays cost money, and we think it would be an excellent plan if groups of undertakings decided to get the best value for this expenditure by interchange. Also, such an arrangement could become more effective if the expert as proposed in the foregoing lent a hand in their production. The standard of showroom window display varies enormously throughout the country; and those undertakings which are behind the times in this respect harm not only their own business but that of their more progressive neighbours.

Products We Do Not Like

ONLY last week we referred to the trouble caused by allowing sulphur compounds to pass along with the gas into the town mains. It is, indeed, difficult to understand why the evils of sulphur on the district have not claimed more attention. Thousands upon thousands of pounds' worth of damage is caused by the corrosion of appliances due largely to the presence of sulphur compounds in the gas burned. And apart entirely from this waste, oxides of sulphur in the products of combustion are bad for the lighting load and for the installation of certain appliances which require no flue. The matter is touched upon by Mr. Shaw in his address. Just over ten years ago he commenced oil washing for the removal of naphthalene, and he has improved the efficiency of extracting sulphur compounds in the one operation. By using quite a moderate quantity of oil he has been able to effect an average reduction of about 18 grains of sulphur per 100 c.ft. in the gas sent out. This must mean a great saving in maintenance charges on the district, and must assist him in retaining the lighting load. In regard to this most important load, we would underline what Mr. Shaw has to say about selling gas for domestic lighting at special rates. We need the lighting load to level up the output curve, and we certainly need it as the first line of defence against electrical competition. We need it, too, to bring up the consumption per consumer; and in this regard our readers will be interested in Mr. Shaw's remarks on the heating of occasional rooms, such as studies. He suggests the incorporation in a gas fire of a small independent air heater consuming very little gas. The products of combustion would be led into the gas fire flue. Though the heating effect would be small, the device could be constantly in operation during the winter months at small cost to the consumer, and it would

maintain that " lived-in " atmosphere. Moreover, the heating effect of the gas fire would be accelerated.

On quite another matter—the sale of coke for the open firegrate—what Mr. Shaw has to say is much to the point. First notice of a new technique for rendering high-temperature coke readily ignitable and free burning in the ordinary firegrate was published in the " JOURNAL " a year ago—actually on March 22, 1933. Subsequently the process was discussed at the research meeting of the Institution of Gas Engineers last autumn. Considering that the new technique holds such promise it is surprising that comparatively little has been done about it in the Gas Industry; and we share Mr. Shaw's hope that, in the financial interests of the Industry, experiments in the spraying of coke will be continued, and that in addition to tar a wide range of oils and chemically treated emulsions should be tried.

We have in the foregoing stressed the importance of co-operation within the Industry. Mr. Shaw's address provides an instance of the value of co-operation between a gas undertaking and an outside body in regard to the disposal of ammoniacal liquor. Thanks to the excellent work of the Effluents and Ammonia Sub-Committee of the Institution of Gas Engineers knowledge is now available which, with the collaboration of the sewage authorities, can smooth away difficulties in the disposal of effluents and ammoniacal liquor itself. The whole of the ammoniacal liquor produced at Buxton is admitted to the sewers and is dealt with successfully at the sewage works. The liquor is not, of course, dumped indiscriminately. Every care is taken to ensure a properly proportioned flow. The method of treatment was described quite recently by the Manager of the Buxton Sewage Works, Mr. F. Oliver, in a paper before the North-Western Branch of the Institute of Sewage Purification, and it was stated during the discussion on the paper that a certain amount of gas liquor has a beneficial effect, rather than the reverse, on sewage purification. Local conditions have a large bearing on the question of liquor disposal, and it is true that Buxton sewage is weak. Yet, as Mr. Oliver said, the gas liquor problem at Buxton was like a red rag to a bull, as most of the councillors were devoted followers of Izaak Walton, and he would probably have " got more stripes " had he objected to the admission of the liquor into the sewer. As it is, the increased ammonia content is probably beneficial, and they are getting more nitrification. The figures in this connection which are put forward by Mr. Shaw in his address should prove useful to others in similar circumstances.

Modern Days Need Modern Methods

" A STAGE has now been reached in the competition between gas and electricity when the costs of production have been, or are within measurable distance of being, reduced to such a point that, in the present state of knowledge, such further economies as are possible on one side or the other will not substantially affect the competitive issues." This quotation from the Address which Mr. Stephen Lacey delivered as President to the Southern Association of Gas Engineers and Managers yesterday is in fact a pointer to the road on which the Gas Industry will have to travel if it is to gain the business which lies at its door. It does not mean, of course, that improvements in the process of gas and bye-products manufacture will not be made. Moreover, there are still a number of gas undertakings content to work at comparatively low efficiency and to offer strange excuses for doing so. They will soon have to make up for lost time. But Mr. Lacey's point is clear enough. The future of the Gas Industry depends upon the perfection of gas supply as regards quality and pressure, upon the appliances used, upon service, methods of charge, sales activities, and publicity. Selling gas is in every sense a commercial business which must employ modern business methods. This will have to be appreciated generally throughout the Industry. In brief, a far greater premium will have to be put on commercial, as distinct from engineering, ability.

At present, as was emphasized in no uncertain terms at the meeting of the Manchester District Association by Mr. C. H. Creasey, H.M. Inspector (Technical Education), who has done such sterling work in connection with the Education Scheme of the Institution of Gas Engineers, and also by Mr. A. McCulloch, of the Manchester College of Technology, the Gas Industry expects a higher standard of education from those engaged on the engineering side than from those on the distribution and supply side. Proof of this is to be found in the number of students taking courses at the educational centres. The number of supply students is wholly disproportionate to the number of engineering students. This is a great mistake, and it is up to the Industry to remedy a state of affairs inimical to its interests. Regional co-operation, which must be accelerated, will result in the closing-down of the inefficient producing stations—it has already done so in several instances—and it is upon distribution and sales that effort will be concentrated. The fight against competition will be on the district, not in the retort house.

It was natural that Mr. Lacey should refer to the activities at Watson House. The work of the Testing Section has vastly improved supplies of materials, and that of the Training Section has, among other things, greatly raised the standard of fitting work on the district. And, as Mr. Lacey says, many new appliances, fittings, and so on, have been developed at Watson House, most or all of them embodying in their design information derived from laboratory research without which such developments would at best have been " hit or miss," or might never have seen the light of day. The results have benefited not only the Gas Light and Coke Company but the Gas Industry as a whole. In speaking of the work of that very important department at Watson House, the Industrial Section, Mr. Lacey rightly emphasizes that obsolete appliances must be replaced by efficient modern ones; and there is far too much out-of-date gas-burning equipment in industrial premises to-day. This equipment is doing incalculable harm to the cause of gas. Mr. Lacey observes: " One can claim with confidence that the most modern forms of gas industrial appliances in Great Britain are ahead of those in any other country in the world." The claim is qualified because it cannot be made about all the industrial gas appliances now in use. Developments in the industrial field at Watson House are carried out in close co-operation with the manufacturers of furnaces, and Mr. Lacey's comments on the policy of the Gas Light and Coke Company in this respect should be noted: " It may happen that we have been the first to develop a new furnace or fitting as an improvement on the old type or as a means of developing a new application of gas, but we do not desire to manufacture such appliances in any quantity. Provided there appears to be a commercial outlet for a design, the various manufacturers are encouraged to undertake its production on their own account, so that its sale may be on the widest basis. Manufacturers are undoubtedly our best allies, provided we retain their goodwill; otherwise they remain potential allies of our competitors." This is an exceedingly important point, and it is to be hoped that existing co-operation between the Industry and manufacturers of appliances will not be weakened by any short-sighted policy, for there is untold scope for the widespread development of industrial gas apparatus.

The " Glycerin " Process

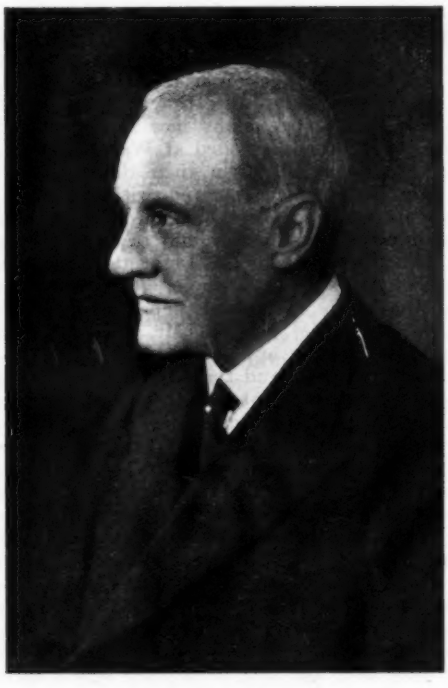
ON later pages will be found an account of the experience at the Luton Gas-Works with a " Glycerin " gas drying plant of a capacity of 5 million c.ft. a day. Operating data covering a period of twelve months are given, and it will be noted that no trouble has been associated with the working of the plant, which embodies automatic concentration of the glycerin in circulation. The figures set out are representative of normal working and show that the humidity extraction—60% from 100%—is regularly achieved. The cost of drying

by the glycerin process is given as 0·24d. per 1,000 c.ft., the water cost being that of pumping only—a cost more than offset by the very great advantages accruing from the distribution of dried gas. In December, 1932, the service complaints caused by water amounted to 363; the complaints due to the same cause in December, 1933, were 17. Last February the number was 3 only. This new information on the "Glycerin" process, originated and developed by Messrs. Kirkham, Hulett, & Chandler, Ltd., should prove of first-rate interest to our readers.

Gas Company Reunion at Portsmouth

Presentation to Mr. T. H. F. Lapthorn

Through the medium of the Portsmouth Gas Company's Social and Athletic Club the Directors of the Company were entertained at dinner in the Guildhall on Monday of last week, the principal object of the occasion being to celebrate the completion of 25 years' service by the Chairman of Directors, Mr. T. H. F. Lapthorn, J.P. During the evening Mr. Lapthorn announced on behalf of the Company the launching of a new Sick Benefit Society which will involve substantial grants from the Company and increase funds and benefits by 50%.



MR. T. H. F. LAPTHORN.

The Engineer and General Manager of the Company (Mr. T. Carmichael), in the capacity of President of the Club, presided over an assembly of 600 workers and guests, including the Lord Mayor (Alderman Sir Harold Pink, J.P.), well known public men, and others associated with the Gas Industry at Gosport and Southampton. In the gallery were about 500 women friends.

Mr. Lapthorn received the Long Service Certificate of the Company, and by the employees was presented with a grandfather clock, a beautiful time-piece. The brass and silver face shows the date 1710. The inscription on the clock reads:

"Presented to T. H. F. Lapthorn, Esq., J.P. (Chairman of the Portsmouth Gas Company), by the whole of the employees on his completing 25 years' service as a Director and as an expression of their appreciation of the interest he has always taken in their welfare, March 19, 1934."

A Big Family Party.

The presentation was made by Mr. Carmichael, who welcomed the guests and made special mention of the attendance of three "boys," Harry Skinner, Tom Goodall, and Alfred James Meadus, who had served under five Chairmen and had each completed 63 years' service with the Company. He welcomed the employees' wives and described the function as a family party.

Mr. Carmichael referred to the desire of the Club to celebrate Mr. Lapthorn's service on the Board for the past quarter of a century, and said there were two landmarks which alone warranted their confidence in him as the Chairman of the Company. He referred to the inauguration of the Workmen's Pension Fund in 1924, and the Life Assurance Scheme formed in 1927.

He went on to say that Mr. Lapthorn took over the Chairmanship of the Company at a time of great difficulty. His aim then was to see the Company progress and take a place second to none in the Gas Industry. It was his ideal and he had had the satisfaction of seeing that ideal realized. The output of gas had doubled. During the busy period of reconstruction he found time to think of ways to help those who were working under him and with him. For all this consideration and thoughtfulness shown for their welfare, the employees desired him to express their thanks, and that he was able to do so in all sincerity seemed to him a sure foundation on which to base the confidence with which they faced the future. They also thanked Mrs. Lapthorn for all she had done for them, directly and indirectly through her husband.

Best wishes to Mr. Lapthorn were expressed on behalf of the various sections of the works by Messrs. A. E. Savins (Flathouse Works), D. T. Marwick (Hilsea Works), J. Wyatt (Rudmore Works), and K. Ayling (Fitting and Lighting Department).

The Chairman's Thanks.

In returning thanks for the gift, Mr. Lapthorn said that throughout his long association with the Board he had desired to gain the confidence and regard of the employees in a fair and straightforward manner, and their recognition of his 25 years' service had proved he had succeeded in that aim. He had been able to receive that expression of their goodwill, he said, because he had been privileged to have the loyal and generous support of his colleagues and of his good friend Mr. Carmichael as the head of the executive staff. He owed much to Mr. Carmichael and to the whole of the staff down to the lowest ranks.

Sick and Burial Fund.

Two years ago the Company were asked by the members of the Employees' Section of the Welfare Committee to give financial assistance to the Sick and Burial Fund. The Board had given the matter careful consideration, and he was now in a position to say that they would be prepared to do so on conditions which he outlined.

The guests were welcomed by Mr. A. J. Garward (Past Chairman of the Club), and thanks were returned by the Lord Mayor, Sir Russell Bencraft (Chairman of the Southampton Gas Company) and Councillor F. Beddow, D.Sc. (a Director of the Portsmouth Gas Company).

Long Service Awards.

Later in the evening presentations were made to Messrs. W. Sawyer (41 years' continuous service), C. Fiford (32 years), W. Kelleway (32 years), and A. Massey (30 years), all of whom were retiring from active service. Long service awards were made to Mr. W. White and Mr. J. Page, and long service certificates were presented to Messrs. T. H. F. Lapthorn, J. Foster, E. Fletcher, E. Harrison, A. Randall, H. Smith, A. Samphier, F. Crout, W. Webb, A. H. Hollis, S. T. Neate, S. Parsons, W. C. Ruston, and A. W. Sparshott.

PERSONAL

From the local Press at Brighouse, Yorkshire, we learn that the reason why Sir Francis Goodenough was unable to fulfil his promise to open a gas exhibition there on March 16 was that he and Lady Goodenough had the honour of dining that evening with Their Majesties at Buckingham Palace. Sir Christopher Clayton, M.P., Chairman of the Liverpool Gas Company, very kindly took the place of Sir Francis at extremely short notice, and performed the opening ceremony of what we understand is proving a highly successful exhibition.

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The resignation of Mr. C. G. Dawson, the Engineer and General Manager of the Torquay and Paignton Gas Company, on account of ill-health, is announced. Mr. Dawson was appointed Engineer and Manager of the Paignton Gas Company in 1896, and on the retirement of the Secretary in 1921 he undertook the duties of that office in addition. He was Engineer, Manager, and Secretary of the Paignton Gas Company at the time of the amalgamation with the

Torquay Company in 1923, when he became General Manager of the joint concern. Mr. Dawson intends to spend his retirement in the town with which he has been so long and so intimately associated, and his friends in and out of the Industry will wish him health and happiness in his well-earned leisure.

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Mr. JOHN BOND, Gas Engineer to the Southport Corporation, retires in June. He was appointed to the position in April, 1904. During the year of his appointment the gas sold by meter amounted to 410 million c.ft., while last year the figure was 743 millions. The gross profit on the Undertaking in 1904 was £22,337, while last year it was £61,237.

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Mr. F. H. LIGHTWOOD having resigned his position as Assistant Secretary to the Institute of Fuel, in order to take up other work, Mr. ROLT HAMMOND, Assoc.M.-Inst.C.E., has been appointed by the Council in his stead.

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Alderman FORRESTER CLAYTON, Chairman of Messrs. Thomas Clayton (Oldbury), Ltd., was on Thursday last appointed High Sheriff of the County of Middlesex.

THE NEWS OF THE WEEK

Successful Cookery Demonstrations have been given at the Chesterfield Corporation Gas Department showrooms by Miss D. M. Baker.

The South-Eastern Gas Corporation, Ltd., and twelve of the Kentish Gas Companies have lately joined the Bribery and Secret Commissions Prevention League, Incorporated.

B.C.G.A.—The Annual Meeting of the Gas Salesmen's Circles will be held in the Caxton Hall, Westminster, on Friday, April 20, when an address will be given by Mr. E. Herbert, M.A., Controller of Sales, Messrs. Wolsey, Ltd., Leicester.

In the "Journal" last week we stated that the Town Council of Dunfermline had decided to take over the Kincardine-on-Forth Gas Undertaking. Mr. James Campbell, Engineer and Manager to the Dunfermline Gas Department, explains that no decision has yet been made.

Under the Auspices of the Whitby Gas Company, a very interesting display of gas apparatus, together with cookery demonstrations by Miss Tuxford, was held at the Church House recently. In connection with the display, a cake-making competition was held, and during the course of the exhibition there were good attendances.

Home-Produced Motor Spirit.—In the House of Commons on March 20, Mr. E. Brown, in reply to a question, said it was estimated that about 43,000,000 gallons of motor spirit was produced in Great Britain from indigenous materials in 1933. This represented about 3¾% of the estimated consumption of motor spirit in that year.

Electrical Propaganda—In our excerpt from the Chairman's address at the annual meeting of the Isle of Thanet Gas Light and Coke Company on p. 677 of the "JOURNAL" for March 14, a typographical error crept into the reference to the expenditure of £1,000,000 on electrical propaganda. The figure should, of course, be £100,000.

An Order has been Placed by the Alliance and Dublin Consumers Gas Company with the Dublin Dockyard Company Vickers (Ireland), Ltd., for a new cross-channel collier, bringing the Company's fleet up to three. Within recent years the Company's output has increased so rapidly that two colliers have proved insufficient for its requirements, and by the purchase of the new vessel it is hoped the necessity for chartering outside tonnage will cease.

Profit-Sharing Schemes.—Mr. R. Hudson, Parliamentary Secretary to the Ministry of Labour, said in the House of Commons last week that at the end of 1932, the latest date for which statistics were available, 293 public companies and firms, other than co-operative societies, were known to have in operation schemes for the participation of employees, on a defined basis, in the profits of the undertakings concerned. About 185,000 employees were participating in these schemes.

Non-Statutory Undertakers Carrying on Two or More Gas Undertakings.

House of Lords Amendments.

When the Gas Undertakings Bill was considered on report in the House of Lords last Thursday, several amendments were agreed to.

Lord Templemore, moving one of them, explained that there are some companies who own non-statutory undertakings in different parts of the country, and it was thought a good thing that each undertaking should be dealt with as a separate unit. The amendment (which was agreed to) was in the following terms:

> "Where any non-statutory undertakers carry on two or more gas undertakings, which are not connected with each other by pipes, the gas supplied by the several undertakings shall, for the purpose of any provision of this Act relating to non-statutory undertakers, be deemed to be supplied by different undertakers."

Lord Mount Temple, on behalf of the National Gas Council, thanked the Government for accepting this amendment which had been brought to their notice.

North British Association of Gas Managers.

Spring Meeting at Perth.

The Spring General Meeting of the North British Association of Gas Managers will be held on Friday, April 6, in the Lesser City Hall, King Edward Street, Perth, at 11 a.m., when the chair will be taken by the Lord Provost.

The President, Mr. Lewis Bain, will deliver an address, following which luncheon will be served at the Station Hotel. After lunch a visit will be made to the Friarton Gas-Works of the Perth Corporation, where tea will be provided.

A golf competition, under handicap rules, will take place over the Gleneagles Golf Course, on Thursday, April 5, when the Silver Cup, presented by Mr. J. Winson Scott, of Manchester, will be played for. Members desiring to take part are requested to communicate at once with the Hon. Secretary, Mr. James O. Scott, New Grange Works, Edinburgh, so that all necessary arrangements may be made.

Training in Laboratory Arts.

The need for the proper training and certificating of laboratory and technical assistants in physics has been recognized for some time past. The Institute of Physics has now announced a scheme to meet this demand, and proposes in due course to set up an appointments register and an organization for these assistants, upon whom the success of many pieces of research has so much depended.

Candidates for the Institute's certificates must attend approved courses of instruction and pass examinations in accordance with the regulations issued. The Institute is

THE NEWS—*continued.*

prepared to recognize schemes of training for this purpose, conducted under approved conditions, submitted by any teaching centre.

It is understood that evening class courses for the Institute's certificates will be commenced in September next in London.

The regulations require the courses to be divided into four sections as follows:

Section A. Practical Mathematics: Physics.
Section B. Simple Wood and Metal Work.
Section C. Glass Blowing.
Section D. Laboratory Technique and Organization.

A detailed syllabus of suggested courses has been published.

To qualify for the award of a certificate a candidate, unless otherwise exempted under the regulations, must in addition to fulfilling certain other qualifications have obtained an adequate standard in Section A and in any two of the three remaining sections.

Full particulars and copies of the regulations may be obtained from the Secretary, Institute of Physics, 1, Lowther Gardens, Exhibition Road, S.W. 7.

South-Eastern Gas Corporation Expansion.

Offer for Herne Bay Company.

An offer to acquire the whole of the issued ordinary share capital of Herne Bay Gas Company, states the *Financial Times*, has been made by the South-Eastern Gas Corporation, the £2,000,000 concern which controls a number of the most important gas supply undertakings in the South-East of England.

Shareholders in Herne Bay Company are offered for each 20 £5 10% standard ordinary shares (£100 nominal value) either £220 in cash or 160 ordinary and 10 redeemable 4½% cumulative preference shares of South-Eastern Gas Corporation, both classes of £1 each, credited as fully paid.

For each 20 £5 7% standard additional and new ordinary shares (£100 nominal value) they are offered either £154 in cash, or 110 £1 ordinary and 10 £1 4½% preference shares of South-Eastern Gas Corporation, credited as fully paid. This is equivalent to £7 14s. in cash, or 5½ ordinary shares and half preference share of South-Eastern Gas Corporation for each 7% standard share of £5 nominal value.

The offer is conditional upon acceptance by holders of not less than 55% of the issued ordinary shares.

Successful Gas Exhibition at Canterbury.

A very successful gas exhibition was recently brought to a close at Canterbury, which proved of great interest locally, it having been visited by nearly 1,500 people.

It was held in the Forresters' Hall and was organized by the Canterbury Gas and Water Company in co-operation with a number of appliance manufacturers, including Messrs. John Wright & Co., Ltd., the Richmond Gas Stove Company, Ltd., R. & A. Main, Ltd., and W. H. Dean & Sons, Ltd.

The Exhibition was opened by Mr. Silas Williamson, J.P. (Chairman of the Gas Company), and twice daily during the week it was running there were cookery demonstrations by Mrs. Trainor, M.C.A.. A cake-baking competition was arranged for consumers residing within the Company's area of supply, and there were 152 entries.

There are in Canterbury 7,648 consumers of gas, using 180,000,000 c.ft. per annum. The Canterbury Company sell 6,205 tons of coke and they carbonize 13,110 tons of coal per annum, a large proportion of it being Kent coal, thus giving occupation to local miners. The area is supplied through 30 miles of main.

More Bicycles—More Gas.

Increased Consumption in Midlands.

The current cycle boom which reached extraordinary figures during the past year has been responsible for a big increase in the gas consumption of many Midland factories. For example, one department of the B.S.A. works—the heating section—ran a night shift throughout the year and used more gas than either Warwick or Stratford-on-Avon during the period.

Over 300,000 parts are carburized weekly, and in addition 100 tons are heat treated. The annual output of springs is three million. In the smithy 132,000 components are brazed every week, while the welding section deals with nearly a million parts a year.

In 1933, 208½ million c.ft. of gas were consumed by this factory.

Staff Dinner at Bristol.

Justifiable optimism as to the future progress and success of the Gas Industry and the Bristol Gas Company in particular permeated the whole of the proceedings at the Grand Hotel, Bristol, when Mr. George H. Boucher, the Chairman of the Company, presided at the Annual Dinner and Social of the secretarial, engineering, distribution, and foreman staffs.

The Chairman was supported by Mr. J. Fuller Eberle, Vice-Chairman; Major Egbert Cadbury and Mr. Francis N. Cowlin (Directors), Mr. J. Edward Grace and Mr. Edward A. Harris (Auditors to the Company); Mr. S. E. Halliwell (Secretary and Commercial Manager), Mr. R. Robertson (Engineer), Mr. Noel S. Smith (Distribution Engineer and Sales Manager), and Mr. J. L. Jennings (Assistant Secretary).

Mr. S. E. Halliwell, in submitting the toast of "The Bristol Gas Company," with which was coupled the names of the Chairman and Directors, expressed the appreciation of the staff for the great kindness of the Directors in once again entertaining them. He called attention to the coloured elevation and plans (on an easel in the hall) of Bristol's new gas offices and showroom, as they would appear when completed. "There is no doubt," he said, "that the building will not only be a credit to the great Gas Industry, but to the City of Bristol."

Mr. Boucher extended a cordial welcome to, and was extremely pleased to see so many of, the pensioners present. Recently he had made a speech to the shareholders, and had suggested that they might be very useful to the Company in recommending their wares, and those remarks applied equally to the present gathering—they could all carry on the good work.

During the past few months they had established records in the output of appliances for lighting, heating, and cooking, which should be a stimulus for the future.

A cordial vote of thanks to the Directors and to the Chairman for presiding was proposed by Mr. Robertson, carried with acclamation, and acknowledged by the Chairman.

Proposed Institute of Vitreous Enamellers.

The Founding Committee of the proposed Institute of Vitreous Enamellers met in London recently, when the suggested objects of the Institute were defined as set out below:

(*a*) To provide a means of bringing into personal contact individuals engaged in the vitreous enamelling industry.

(*b*) To provide facilities for the statement, discussion, and elucidation of scientific and technical problems arising in all processes involved in vitreous enamelling.

(*c*) To establish for the use of firm-members (for optional use) a registered mark or symbol signifying "Genuine Vitreous Porcelain Enamel."

(*d*) To afford a channel for the making of representations to Government and public-utility bodies, in respect of any matters appertaining to the welfare of the industry.

(*e*) To co-operate with other Institutes, Societies, and Associations, in the furtherance of this purpose.

It was recommended that there should be four classes of members—namely, firm-members, ordinary members, associate members, and associates, with subscriptions ranging from £3 3s. per annum for a firm-member to 10s. 6d. per annum for an associate.

It was agreed by the Founding Committee that a general meeting of the enamelling trade should be called for Wednesday, March 28, at the Chamber of Commerce in Birmingham.

The Acting Secretary was instructed to communicate to the trade in the form of a circular letter the main decisions arrived at during the meeting, and any further information in connection with the Institute may be obtained from Mr. J. F. Barry, Acting Secretary to the Founding Committee, 26, Wharton Street, London, W.C. 1.

THE NEWS—continued.

SIR ARTHUR DUCKHAM MEMORIAL FUND

Official List of Donations from March 17 to 23

Name and Town.	Amount. £ s. d.
Arundel Gas Company	1 11 6
Banbury Gas Company	1 1 0
Chris. F. Barrow, Sunderland	1 1 0
Sir J. Ferguson Bell, Mickleover	5 0 0
Braintree and Bocking Gas Company, Ltd.	2 2 0
J. S. S. Brame, Blackheath	5 5 0
J. H. Brearley, Harrogate	1 1 0
A. B. Britton, Hinckley	1 1 0
A. W. Brookes, Hove	2 2 0
"C. H. S.," 334 (Wednesbury)	0 5 0
Cardiff Gas Light and Coke Company	50 0 0
Samuel B. Chandler, London	1 1 0
Cirencester Gas Company, Ltd.	3 10 0
Coke Oven Managers' Association	26 5 0
Alexander Comley, Ltd., Birmingham	2 2 0
Harold E. Copp, Hull	3 3 0
E. Crowther, Bradford	1 1 0
Dursley Gas Light and Coke Company, Ltd.	1 1 0
Exeter Gaslight and Coke Company	18 11 6
Grantham Gas Company	2 2 0
Ralph Halkett, Sheffield	3 3 0
H. Hollings, London	1 1 0
R. W. Hunter, Beckton	1 1 0
Kettering Gas Company	5 5 0
D. T. Livesey, Burgess Hill	1 0 0
Sir Henry P. Maybury, London	2 2 0
Metropolitan Gas Meters, Ltd., Nottingham	5 5 0
Mid-Southern Utility Company, Aldershot	5 5 0
Milne's Meters, Ltd., Edinburgh	3 3 0
H. Moys, London	1 1 0
Newcastle-upon-Tyne and Gateshead Gas Company	131 5 0
Philip B. Nicholson, J.P., Wath-upon-Dearne	1 1 0
Old Blackheathen Club: Edward Huntley Marriott	1 1 0
County Borough of Oldham	47 10 0
Clifford E. Paige, Brooklyn, N.Y.	2 0 0
Pembroke District Gas Company	3 0 0
Penistone and District Gas Company	2 2 0
Portsmouth Gas Company	100 0 0
W. E. Price, West Chobham	2 2 0
C. D. Shann, London	1 1 0
Sheffield Gas Company	133 2 0
Shotley Bridge and Consett District Gas Company	2 10 0
A. H. Solomon, London	1 1 0
South Shields Gas Company	10 10 0
Stretford and District Gas Board	35 0 0
Swansea Gas Light Company	10 10 0
H. Stanley Taylor, Bath	4 4 0
Tottenham and District Gas Company; Hitchin and District Gas Company; Stevenage Gas and Coke Company, Ltd.	105 0 0
Frederick Vale, Stourport	26 5 0
Whessoe Foundry and Engineering Company, Ltd., Darlington	3 3 0
S. E. Whitehead, Southampton	2 2 0
John H Wright, Luton	1 1 0
Donations (52) paid above	£ 783 2 0
Donations (290) paid previously	3,775 19 0
Total Donations (342) paid	£4,559 1 0
Donations (20) promised	3,249 5 0
Total Donations (362) paid or promised	£7,808 6 0

Newcastle Company's Year Book.

The 1934 Year Book of the Newcastle-upon-Tyne and Gateshead Gas Company is an interesting and informative publication, which contains a record of the progress, policies, and achievements of the Company, together with information concerning the Gas Industry in general.

After the usual re-print of the Directors' report for the year and the proceedings at the Company's Annual Meeting, the Year Book goes on to draw attention to the financial security of gas stocks, to which no more striking tribute can be paid than the attitude the City adopts towards them. Details are given pictorially of items of interest in the Company's year, among these the fact that an increase of 5,000 consumers was recorded, bringing the total to 205,641; also, it is pointed out that over 500 miles of Newcastle's streets are lighted by gas, and that the Company employs directly over 1,700 persons, keeping, in addition, over 800 miners in constant employment in producing the coal required.

The Year Book also gives interesting details and illustrations of some of the many domestic and industrial applications of gas, and concludes with a note regarding the care taken by the Newcastle Company in respect of the welfare of its employees, including pension fund, sick benefit society, profit-sharing scheme, and facilities for recreations.

Exhibition of Lighting Equipment.

The North-Western Area Branch of the Illuminating Engineering Society held a successful meeting in the College of Technology, Manchester, on March 15. The President of the Society, Mr. C. W. Sully, delivered an address on "Artificial Lighting—a Vista of the Future" to an audience too large for the hall that had been engaged for the meeting.

Exhibits showing recent advances in illumination engineering were on view.

A short demonstration was then given by various members of the electrical industry on their respective exhibits. The gas exhibits had been brought together by the Chief Engineer of the Manchester Corporation Gas Department (Mr. A. L. Holton), and were explained by a member of his staff, Mr. Mainwaring. The exhibits were:

James Keith & Blackman Company, Ltd.

(*a*) High-pressure indoor decorative lamp, illustrating a considerable improvement in the appearance; also the silent burning of the lamp.

(*b*) New type of high-pressure lamp embodying improved preheating of the gas and air using smaller mantles than is customary.

(*c*) Low-pressure decorative lamp. In this type, the regulators are entirely enclosed, and the lamp gives a pleasing appearance.

Chance Brothers, Ltd.

A new type of decorative globe for indoor lighting, square in shape giving a modern appearance.

Foster & Pullen, Ltd.

Suspension lamp, fitted with Holophane refractor between the globe and the cluster burner. In that position, the refractor serves to deflect the light rays and also prevents the cold air stream from impinging upon the mantles, thus maintaining a higher flame temperature.

W. Parkinson & Co., Ltd.

(*a*) Curved top reflector lamp, with "Mor-lite" reflector below the mantles.

(*b*) Floodlight of the alignment type.

(*c*) The Parkinson jet balance for calibrating a number of jets against a master jet.

W. Sugg & Co., Ltd.

(*a*) Upright "Rochester" suspension lamp, fitted with "Multi-Ray" reflectors.

(*b*) The Tower Bridge "Grosvenor" 3-pane lamp, incorporating symmetry in design to suit the general surroundings of its position. The lamp derives its name from the fact that the type is erected on the Tower Bridge, London.

(*c*) Floodlights of the projector and prism-surfaced reflector type.

(*d*) "Rochester" lamp with dish refractor.

C. H. Kempton & Co., Ltd.

Two-way "Kempar" lamp which introduces a departure in design and construction. It has stainless steel parabolic reflectors extending the full depth of the lantern with 4 bijou burners in front of each reflector.

The Horstmann Gear Company, Ltd.

(*a*) Time gas switch, for automatically extinguishing a light after a pre-determined time ranging from one minute to two hours. It is particularly designed for extinguishing a stair light or similar unit.

(*b*) By-pass lighting switch.

(*c*) Catalytic ignition switch, which renders unnecessary a by-pass switch, except for a few minutes at lighting time.

The Bloor by-pass nozzle, which has a consumption of approximately 1/10th c.ft. per hour.

NEW GAS SHOWROOMS
- AT STRATFORD -

Fine premises for the Gas Light and Coke Company at Broadway, Stratford

A feature of the Gas Light and Coke Company's new showrooms at Stratford is the inclusion of a comprehensive industrial section, where industrialists in the district will be able to see how gas can help them in their many and varied processes.

The new premises form an imposing block on Broadway, Stratford, very nearly opposite the Town Hall, and they were opened on March 21 by Mr. T. E. Groves, J.P., who is Member of Parliament for the Division.

On entering the showroom from the street one steps into a spacious hall, warmed by six of the latest types of gas fire. On either side are two bays—one being devoted to a display of different types of water heater arranged to discharge hot water into a common polished metal trough. The other bay contains examples of the latest types of gas cooker in attractive finishes, and these are arranged in tiled alcoves effectively illuminated by concealed lighting above. It is noticeable that many of the cookers are fitted with automatic lighters to obviate the use of matches. In the first bay there is also what the Company call their "gadget table." This is a large black table bound in polished steel and mounted upon an illuminated base, on which are displayed the various small domestic gas appliances which lend themselves to being carried from room to room as required and plugged in to any convenient gas plug. Such plugs are distributed round the edges of the "table" and illustrate admirably the advantages and simplicity of using such portable appliances as the gas poker, iron, self-contained kettle, gas toaster, bowl heater, and many others.

Beyond the hall is the pendant room, so called by reason of the fact that it is principally given over to showing a wide range of fittings for gas lighting. There are also more ideas in regard to the modern treatment of gas fires, and an example of the "Cleanglow" grate for open smokeless fires. The general lighting of the interior is very effective, while the interior colour scheme of primrose and blue is both modern and attractive. An inquiry counter and cashiers' section is provided, and gas-illuminated signs direct the customer to the various departments in the building.

Industrial Section.

Particularly interesting from the Gas Industry's point of view is the industrial section—an innovation so far as the Gas Light and Coke Company's ordinary showrooms are concerned.

This is a bright, airy room, immediately behind the domestic section of the showroom, and while a very wide range of appliances cannot of necessity be exhibited, a comprehensive selection has, nevertheless, been made of such apparatus as are calculated to be of interest to the particular industrial activities of the district. Nor, of course, is it possible to have such large appliances connected up for demonstration purposes, though, indeed, a small muffle furnace, complete with pyrometer recording up to 1,000° C., is seen in operation.

Among the apparatus in this section are the following: Triple concentric burner, double oven range and hot closet, fish-frying range, vegetable steamer, bakers' oven, large commercial size gas-operated refrigerator, a café boiler for general canteen purposes, set pot for oil boiling, glue pot cabinet, surface combustion furnace, oven and frit furnaces, soldering stoves, salt bath furnace, steam raising boiler, high-speed steel furnace, rivet heating furnace, soft metal melting furnace, and a unit air-heater for factories.

This industrial showroom cannot fail to be of considerable value to the large industrial concerns for which Stratford and the surrounding districts are noted.

Demonstration Room.

Leading out of the industrial showroom is a large cookery demonstration room, which is capable of seating nearly a hundred persons. This room, warmed by cabinet radiators round the walls, is decorated in a pleasant scheme of cream and green, and has a roomy platform at one end which is fitted up as a model kitchen, complete with cooker, water heater, refrigerator, drying cabinet, and so on. An interesting feature is the gas meters attached to the two cookers. These have large diameter dials situated high up on the wall well within view of all in the room, showing exactly how many c.ft. of gas are needed to cook the different dishes prepared in the demonstrations.

On the floor immediately above the showroom are the offices for the clerical staff, and these comprise light and spacious rooms to accommodate a district staff of more than fifty. On the second floor is the telephone operator's room, cloak rooms, and further offices, while there are still more rooms on the third floor available to be put into service when required. The upper floors are part of an original building, which has been altered structurally to suit the Company's requirements.

The Opening Ceremony.

As has been stated, the new premises were formally declared open by Mr. T. E. Groves, M.P., who was accompanied by Mrs. Groves, officials and members of the Borough Council, Mr. Will Thorne, M.P., and many prominent local residents. The company were entertained at tea, the Governor of the Gas Light and Coke Company, Sir David Milne-Watson, LL.D., D.L., presiding, supported by Mr. Walter Tapper (the Architect responsible for the new building), Mr. R. W. Foot (General Manager), Mr. W. L. Galbraith (Secretary), Mr. Stephen Lacey (Controller of Gas Sales), and other senior officials.

Sir David Milne-Watson extended a hearty welcome to those present, and referred to the fact that gas had been manufactured in the Borough for a very long period by what was originally the West Ham Gas Company, which had works in Stratford. But there had never before been adequate gas showrooms in which they would exhibit the products of the gasworks. So they were met on that occasion to open what he hoped they would agree were handsome premises in the principal street of Stratford. The West Ham Gas Company, continued Sir David, was taken over by the Gas Light and Coke Company in 1909, and that amalgamation laid the foundation of the progress of their Company, which had now become the largest and greatest gas undertaking in the country and probably in the world. There had been amalgamations before this date, but nothing for a long time. It therefore began that new era of extension in the Company, whose district now extended from Windsor to Southend-on-Sea.

But the Gas Light and Coke Company did not rely on their size; they wanted to lead also in progress—to be not only the largest but the most progressive gas undertaking in the country. That was their aim and object; and these showrooms in which they were assembled were the outward and visible sign of their desire to meet the requirements of the enormous population who used gas. This was the 53rd showroom in the Gas Light and Coke Company's district. With a district like theirs it was impossible to expect customers to go to a central building in order to see what gas could do. So they had deliberately adopted a policy of opening district showrooms, where, without trouble, customers could see all that gas could do for them. The Company had also done something of local interest. They had opened for the first time an industrial showroom. They already had an industrial showroom at Watson House, which was a central showroom not everyone could visit because it was some distance away. But here in Stratford they had an interesting collection of industrial apparatus, knowing as they did that Stratford was an industrial and industrious place, whose industries were growing.

In conclusion, Sir David said that these showrooms were a present to Stratford, and he hoped that Stratford would use them. He thanked Mr. Groves for coming and called upon him formally to declare the premises open.

An Industry for Social Welfare.

Mr. T. E. Groves said that it had been with great pleasure that he had accepted this invitation to declare the showrooms open. He was, he said, a member of the West Ham Council, and was therefore related in large measure to a great electrical undertaking, but, nevertheless, he did not refuse the invitation because he felt that in this country to-day there was room for two such industries for the social welfare of the people.

Sir David Milne-Watson thanked Mr. Groves for declaring the showrooms open, and as a memento of the occasion presented him with an inscribed silver salver.

Mr. Will Thorne proposed a very cordial vote of thanks to Sir David Milne-Watson for giving them the opportunity of coming there that afternoon. Mr. Thorne recalled that 45 years ago he had been working at the Beckton works of the Gas Light and Coke Company, and remarked that work in gasworks to-day was very different to what it was then. He said how pleased he was to have worked with Sir David for many years on the Joint Industrial Council for the Gas Industry, and regretted his severance shortly with that body.

Sir David Milne-Watson expressed appreciation of the kind way his old friend Mr. Will Thorne had proposed the vote of thanks. They were very sorry to hear that Mr. Thorne was leaving the service of the Industry in which he had so long occupied an eminent position.

The "Glycerin" Gas Dehydration Process

Experiences at Luton Gas-Works

By A. F. H. KNOWLES, B.Sc. (Lond.), and ROY SUMMERSON, Assoc.M.Inst.Gas E.

Since the last article was written on this subject ("JOURNAL" for May 6, 1931), much information and experience on the Glycerin Gas Dehydration Process has been gathered at Luton, where the first 5 million c.ft. per diem plant operating on this process, which was originated and developed by Messrs. Kirkham, Hulett, & Chandler, Ltd., Gas Engineers, Union Foundry, Mansfield, has been at work for over 12 months. It is now possible to publish accurate data concerning the working of the plant, and to appreciate the advantages of commercial "Glycerin" as a dehydration medium.

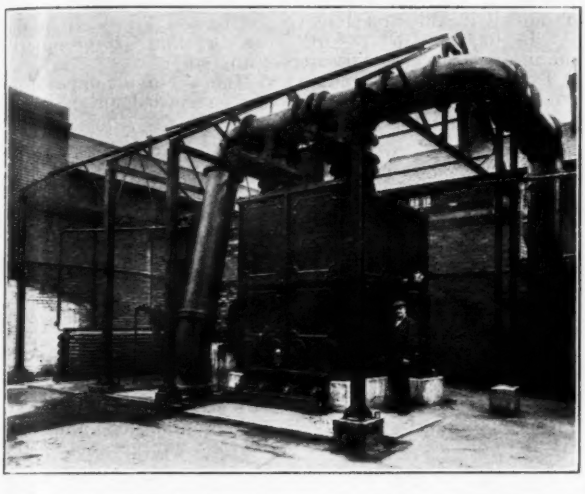


Fig. 1.—Showing the "Glycerin" Gas Drying Plant at the Luton Gas-Works.

The plant is illustrated in fig. 1, and the diagrammatic arrangement in fig. 2 shows more clearly the automatic arrangement for concentrating the glycerin in circulation.

OPERATION OF PLANT.

The mode of operation of this larger unit is very similar to that adopted in the case of the smaller plants operating at the Colwyn Bay, Ilkeston, and Burton Gas-Works, though minor improvements, which have suggested themselves as experience was gained in operating the plant, have been embodied.

The normal working of the plant can be followed from fig. 2. The concentrated "glycerin" flows from the upper concentrated liquor storage tank A, on top of the washer, through a small cooler and an adjustable cock and look box, into the washer. Here it flows counter current to the gas, through the four sections of the machine. The washer is of the latest rotary square type design of Messrs. Kirkham, Hulett, & Chandler, and is fitted with a central shaft rotating at 2 r.p.m., which is driven through a spur and worm drive from a 5 h.p. Marshall horizontal engine. As the glycerin passes through the machine, it is, of course, weakened by the extraction of the water vapour from the gas, and the weakened glycerin flows from the last bay (on the gas inlet end) to the lower weak storage tank B.

GLYCERIN CONCENTRATION.

The glycerin concentration circuit consists of a Scott vacuum evaporator, Edward horizontal type air pump, look box, water-tube cooler, and lower concentrated glycerin storage tank, which also contains some additional water-cooled pipes. The glycerin is concentrated at a vacuum of about 27 in. mercury and a temperature of about 120° C., to a strength of 60° to 62° Twaddell—*i.e.*, a sp.gr. of about 1·3 and a glycerin concentration of about 82%. The hot glycerin flows from the evaporator through the look box and cooler to the lower concentrated glycerin storage tank. The degree of cooling is indicated by a thermometer on the cooler outlet and is readily controlled by regulating the flow of cooling water. It is found necessary to run the evaporator less than 8 hours per diem (see Table II.). From the lower storage tank, the concentrated glycerin is pumped at a temperature of about 65° F. to the main storage tank on the washer by means of a pump belt driven directly from the main shaft. In spite of the high viscosity of the concentrated glycerin, no difficulty whatever has been found in practice in pumping it, and in getting the necessary quan-

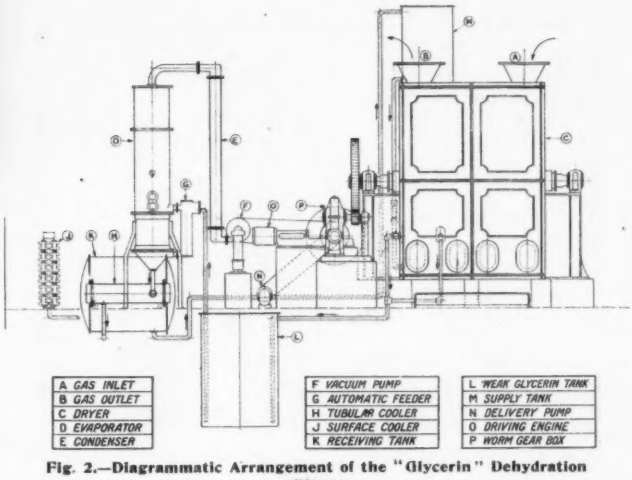


Fig. 2.—Diagrammatic Arrangement of the "Glycerin" Dehydration Plant.

TABLE I.

Date of Test.	Average Inlet Gas, Temp. °F.	Average Glycerin Strengths. No. 1 Bay, °Tw.	Average Glycerin Strengths. No. 4 Bay, °Tw.	Gas Treated at Daily Rate of C.Ft.	Dew Points. Inlet Gas, °F.	Dew Points. Outlet Gas, °F.	Reduction in Dew Point, °F.	Saturations. Inlet Gas, %.	Saturations. Outlet Gas, %.	Reduction in Saturation, %
1933.										
July 17–18	70	48	50	2,105,000	62	40	22	76	33	43
,, 21–22	72	50	56	2,145,000	63	37	26	72	27	45
,, 25–26	75	52	56·5	2,075,000	72	42	30	90	30	60
,, 27–28	76	51	57	1,990,000	71	49	22	84	39	45
,, 31–Aug. 1	72	51	57	2,130,000	68	43	25	88	35	53
Aug. 24–25	69	52	57	2,450,000	67	38	29	93	32	61
,, 30–31	72	48·5	56·5	2,431,000	68	47	21	86	40	46
Sept. 14–15	67	48	54	2,440,000	63·5	47	16·5	89	48	41
,, 19–20	68	52	55	2,290,000	66	47	19	91	45	46
,, 27 28	65	53	57	2,490,000	65	39	26	100	38	62
Oct. 12–13	63	52	56	2,544,000	62	35	27	96	36	60
,, 26–27	58	52	56	2,625,000	56·5	34·5	22	94	40	54
Nov. 14–15	58	51	56	2,840,000	58	32	26	100	38	62
,, 23–24	61	51·5	56	2,764,000	60	33·5	26·5	96	37	59
Dec. 14–15	53	51	55	3,301,000	53	30	23	100	40	60
1934.										
Jan. 7– 8	60·5	50	55·5	2,988,000	60·5	42	18·5	100	51·5	48·5
,, 18–19	60	51	58	2,854,000	60	37	23	100	42	58
,, 31–Feb. 1	59·5	49	59	2,949,000	59·5	37	22·5	100	42	58
Feb. 15–16	61	50·5	58·5	2,862,000	61	38	23	100	40	60

TABLE II.—*Averages from Once Daily Readings Taken About 8 a.m.*

Month.	Gas Temperatures, ° F.						Glycerin Temperatures, ° F.						Glycerin Strengths, ° Tw.				Average Daily Period Worked by Evaporator. Hours.
	Inlet.	Bay 1.	Bay 2.	Bay 3.	Bay 4.	Outlet.	Bay 1.	Bay 2.	Bay 3.	Bay 4.	Rack Cooler Inlet.	Rack Cooler Outlet.	Bay 1.	Bay 2.	Bay 3.	Bay 4.	
1933.																	
July	72	77	85	85	81	81	84	87	88	81	82	74	51	52	53	54	10¾
August	72	78	86	86	79	79	85	88	88	80	80	72	51	53	55	57	8
September	68	73	79	79	76	76	78	81	81	75	75	69	50	52	54	56	7¼
October	62	66	72	72	68	68	71	74	74	68	70	65	53	54	56	57	9¼
November	59	62	68	68	64	64	66	69	69	65	66	62	52	54	55	57	7¾
December	56	57	62	63	59	59	61	64	64	60	61	58	51	53	55	56	7¼

tity through the washer. The viscosity decreases very rapidly on dilution with the extracted water.

GLYCERIN COOLING.

As the gas passes through the glycerin, a temperature rise in the glycerin and in the gas takes place. Table II. gives the average temperatures found on the plant for some months. In order to counteract this temperature rise and maintain the vapour pressure of the glycerin in the last bay as low as possible, the strong glycerin in the final bay of the machine is circulated by means of a pump, through a cooler consisting of 3 in. wrought-iron tubes, over which water passes from an overhead trough. The effect of this on the gas and glycerin temperatures in the last bay is shown in Table II. The total amount of water used on the plant is about 12,000 gallons per diem.

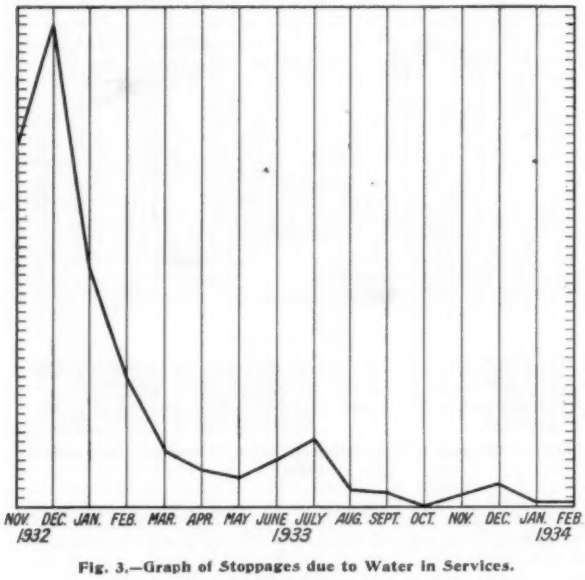


Fig. 3.—Graph of Stoppages due to Water in Services.

[Plant shut down June 21—July 15, 1933.]

In putting the plant into operation, some 9 tons of commercial salt crude glycerin were put into the machine, the supply being provided by the contractors, the latter having included for this in their tender. To meet the slight loss which occurs in re-concentrating the glycerin, it has been found at Luton that less than 4 tons of glycerin is required per annum on a make of about 850 million c.ft. The amount of glycerin in circuit is ample, so that the periods when the evaporator is put into operation can be varied to suit convenient times for the engine men on varied shifts. The only attention required by the plant other than the usual attention given to other purification plants, is putting the evaporator into operation, which is a simple procedure. Once started, it works continuously and automatically, and is shut down when all the weak glycerin has been concentrated.

WORKING RESULTS.

In Table I. are tabulated a series of tests on the plant undertaken in the latter half of 1933 and early 1934. These were the whole of the tests carried out by the Luton Gas Company's Laboratory Staff in that period, and were made at irregular intervals, without previous warning to the plant attendant. They are therefore fully representative of normal working and demonstrate that, in summer and winter, the dew-point of the gas is reduced by the amount expected of such plants and that the humidity extraction guaranteed by the contractors—namely, 60% from 100%—has been regularly achieved. It has been proved that the attainment and maintenance of this guaranteed figure is simply a matter of putting sufficient strong glycerin through the plant, so that the strength varies from 51° or 52° Twaddell in the first bay to 56° to 58° Twaddell in the fourth bay. Such strengths can be, and are, regularly maintained without difficulty of any sort.

Table II. gives a summary of the average temperature conditions, glycerin strengths, &c., recorded on the plant for the latter half of 1933.

OPERATING COSTS.

The actual costs of the process are as follows:

(1) Interest and depreciation	0·0115	pence	per	therm treated
(2) Glycerin loss	0·0059	,,	,,	,,
(3) Labour cost	0·0055	,,	,,	,,
(4) Water consumption	0·0016	,,	,,	,,
(5) Oil consumption	0·0003	,,	,,	,,
(6) Steam	0·0242	,,	,,	,,
Total	0·049	,,	,,	,,

= 0·049 × 4·9 = 0·24d. per 1000 c.ft. of 490 B.Th.U. gas treated.

These costs are based on the following:

(1) Capital cost of plant, £1,850. Foundations and shed, £150. Total, £2,000. Interest charges, 5%. Depreciation, 5%.
(2) Glycerin loss, 3·7 tons per annum, 850 million c.ft. treated, £27 10s. per ton.
(3) Labour cost, 63 pence per day.
(4) Water cost, 1½d. per 1,000 gallons (cost of pumping only). Consumption about 375 gallons per hour with glycerin evaporated off, 750 gallons per hour with evaporator on, total consumption about 5,200 gallons per million c.ft.
(5) Oil cost, 1½d. per million c.ft.
(6) Steam cost of 1s. 6d. per 1,000 lbs. Steam consumption about 5,040 lbs. per million c.ft. for evaporator and about 1,540 lbs. for engine.

BENEFITS.

The main object in gas drying culminates in the benefits which are derived outside the gas-works, and which mainly come under the jurisdiction of the distribution superintendent. At Luton the expected advantages have accrued, and the mains and services are now practically dried out. Nearly all the service stoppages experienced now are caused by rust. The number of service complaints caused by water since the plant was started are as follows:

November, 1932	271	July, 1933	51
December, ,,	163	August, ,,	16
January, 1933	183	September, ,,	12
February, ,,	97	October, ,,	0
March, ,,	45	November, ,,	11
April, ,,	28	December, ,,	17
May, ,,	23	January, 1934	4
June, ,,	37	February, ,,	3

Plant shut down for alterations June 21–July 15, 1933.

In conclusion, a few of the relative advantages of the use of glycerin for the purpose of gas dehydration might be summed up as follows: The plant is clean, compact, and easy to work; it is also inexpensive, the total operation costs being under 0·25d. per 1,000 c.ft., as shown above. The glycerin circuit is entirely closed. Glycerin itself is a medium which cannot possibly solidify, and is so chemically inactive in its normal condition that it is absolutely immune from reaction with any of the constituents of the gas, whether sulphur, ammonia, or benzole derivatives. There has been no corrosion whatever, no pumping troubles, and no sludging. The district has benefited very considerably from the dry gas, with its improved service.

Our thanks are due to Mr. Wm. Phillips, General Manager and Engineer to the Luton Gas Company, and his Directors for kind permission to publish these data.

Presidential Address

Of Stephen Lacey, B.Sc., M.Inst.C.E., Controller of Gas Sales of the Gas Light and Coke Company.

[Southern Association of Gas Engineers and Managers, March 27, 1934.]

Since you did me the honour of electing me your President for the current year I have naturally thought about the history of the Association, comparing its original purposes and personnel with those of the present day and considering the part it plays in the service of the Gas Industry, at a time when the pressure of increasing competition focusses our attention more and more on what we call "the district."

These reflections led me to look up the review with which Mr. H. C. Smith, your President for 1931, after several years' previous experience as Hon. Secretary, opened his address; and I venture to give a *précis* of his remarks, because they indicate where we stand to-day. Reminding members of the original purpose of the Association—to promote more frequent intercourse among Gas Engineers and Managers connected with the Southern Counties—Mr. Smith urged more regular attendance at the meetings of the Eastern and Western Sections, and, referring to the phrase "on all matters of gas engineering and manufacture" which appeared in one of the original regulations, suggested that if the founders of the Association could have foreseen its subsequent development they might well have substituted "on all matters connected with the Gas Industry." And he then went on, quite consistently, to say that he disagreed with the view recently expressed that the Southern and all other Associations of Gas Engineers and Managers should sink their identities and become district sections of the Institution of Gas Engineers.

This declaration of freedom, as it were, is in keeping with the 1927 amendment of the rules relating to eligibility for membership, and with the tendency of the discussions at the district meetings to become increasingly commercial, both as regards subject-matter and point of view; and everything points to further movement in the same direction as being an essential condition of the Association's continued usefulness.

Personnel of the Association.

While membership is open to the responsible officers of undertakings, still relatively few, of such a magnitude that the multifarious duties of the Engineer-Manager must be shared by several, perhaps many men, it remains true that the majority of our members are Engineer-Managers of the medium sized and smaller undertakings upon whom devolves responsibility for the whole gamut of widely different though related activities comprising the production, utilization, service, sales, and publicity of gas and its bye-products.

The members may thus be divided into two main classes—on the one hand, the Engineer-Managers, who may be said to be the direct successors of the original members of the Association; on the other hand, the specialists, so to speak, of the larger undertakings who collectively cover the same ground. The bringing together of these two classes in the friendly atmosphere so characteristic of this Association benefits all the gas undertakings represented, large and small, and may be made one of the best means of helping forward schemes of regional co-operation which, it is now generally agreed, must be developed much more quickly than at present if the voluntary re-organization of the Gas Industry is to be a match for the compulsory re-organization of its chief competitor.

Electrical Competition.

A stage has now been reached in the competition between gas and electricity when the costs of production have been, or are within measurable distance of being, reduced to such a point that, in the present state of knowledge, such further economies as are possible on one side or the other will not substantially affect the competitive issues. So far so good, because it means that gas is in no danger of losing the initial economic advantage that, on a thermal basis, its cost into holders is small, generally speaking, as compared with the cost of electricity from the "grid."

And thus it has come about that the chief advantage to the electrical industry of the "grid" lies not as was at first thought in reduction of costs of generation and wholesale distribution, but in the release of the administrative and technical ability that has been hitherto largely devoted to electrical generation, and its employment, reinforced by new commercial blood, in the field of domestic sales development. The Gas Industry has shown the way, and our competitors are following suit with the advantage of starting with practically a clean slate, unhampered, for example, by a large number of appliances in use that will not bear comparison, either as regards design or appearance, with those of the present day, and free to adopt such methods of charge as they think best calculated to capture the whole domestic load.

Now I am not suggesting, of course, that the Gas Industry can afford to relax its efforts to make further economies in production, nor do I overlook the economies that can yet be effected by the linking-up of distribution systems, and the closing of small and relatively inefficient works. I merely want to emphasize the point that the competitive issues must mainly depend in the near future upon the perfection of gas supply as regards quality and uniformity of pressure, upon the kind of appliances used by our customers, upon our service, methods of charge, sales activities, and publicity.

There is, of course, nothing at all original in this. Indeed it is no more than a statement of facts familiar to all alive to the realities of the present competitive situation.

THE PRESIDENT.
Stephen Lacey, B.Sc., M.Inst.C.E., M.Inst.Gas E.

Mr. Lacey obtained his engineering training at the City and Guilds College, South Kensington, and after five years with Messrs. G. H. Hill & Sons, Consulting Engineers, entered the service of the Gas Light and Coke Company in 1911 as assistant to the then Distributing Engineer, Mr. H. S. Reeson, whom he succeeded in 1918. In 1923 he was appointed Deputy to Sir Francis Goodenough, devoting special attention to the technical activities of the Department which, in 1926, were brought together in Watson House. On the retirement of Sir Francis in 1932, Mr. Lacey became Controller of Gas Sales.

But they are facts that can hardly be repeated too often, because they must obviously be taken into account in all planning for the future, and therefore the sooner their significance is universally realized the better co-ordinated and more effective counter action will be.

Incidentally one must beware, when calling attention to the need for facing facts, of giving the impression that the Industry as a whole lacks the ability and vitality to deal with new forms of competition and to adapt itself to changing conditions; when, in fact, the achievements of the last thirty years, which have won for the Gas Industry a well-deserved reputation for resourcefulness, co-operation, enterprise, and leadership, prove the contrary to be true.

New Standards in the Home.

At the same time, one has to be mighty quick in these days to keep pace with the times; for invention and applied

science have a way of altering the material conditions of existence at a disconcerting rate. Consider, for example, the development of vitreous enamels, heat resisting paints in any desired colour, and chromium plating during the last few years. These new labour-saving and decorative finishes are making many of the older gas appliances, in common with many other things in the home, look out of date, and are exposing them to a form of competition that turns far more on appearance than on performance. Gas, the most economical, speedy, and easily controllable heat on tap, still suffers from associations with times past; it therefore stands to gain enormously by being represented in up-to-date forms in modern settings.

Here, then, we have a state of affairs that can properly be described as critical, because so much depends upon the time factor. Apathy or half-hearted action would certainly lead to a loss of business that ought to be held; on the other hand, if the rapidly increasing demand for up-to-date gas appliances in place of old is not only met but stimulated, existing business will quickly be re-established on a new basis, and a great deal of additional business obtained at the same time. And at this point I should like to say that it would be a grave mistake to be so concerned with the retention of existing business as to over-look or under-estimate the expansion of the heat market that accompanies the rising standard of comfort in the home. Comfortably warmed houses, with " no cold corners " and ample supplies of hot water, are still comparatively rare, and there is plenty of evidence to show that properly planned and well directed sales campaigns reap rewards that will be greatly increased as trade revives.

Questions of Sales Policy.

Having in view a picture of district conditions similar to that I have outlined, those responsible for formulating and directing the sales policy of gas undertakings—and looking to the future—find themselves with plenty to do and faced with a number of problems, some concerned with statutory powers and limitations, that are frequently under discussion at meetings of gas men and in the Technical Press.

What, for example, are the most attractive terms on which up-to-date appliances can be offered to consumers, both ordinary and prepayment, and how, at the same time, can we enlist the help of the big stores, builder-decorators, and ironmongers in the sale and installation of gas appliances of approved design, thus increasing the number of agents interested in promoting the use of gas?

Again, what is the best way or the best ways of giving a price advantage to " good consumers " that will result in a substantially increased total consumption?—a question that the Gas Industry should obviously be as free to deal with as its competitors.

Our Association cannot directly help in the efforts being made to obtain relief from the burden of unfair statutory restrictions, but it can and does help, within its limits, in furthering a common and progressive sales policy by encouraging representatives of enterprising undertakings, which have taken the lead in one way or another, to give their fellow members the benefit of their experience.

Many a relatively small undertaking has been of great service to the whole Industry by putting to the test new methods that would be almost impossible to try out for the first time on a very large scale.

Now I do not propose to express views on these and other similar questions this afternoon, partly because no discussion is allowed on this, for me, privileged occasion, and partly because there are other matters I should like briefly to refer to more closely related to the work of the Engineer as such.

Service the Indispensable Background of Sales.

Thanks mainly to the unremitting work of the British Commercial Gas Association, extending over a quarter-of-a-century, the Gas Industry as a whole is well to the fore in realizing and acting upon the truth that sales effort is fruitless, in the long run, unless sustained and reinforced by good service; and it would be difficult to exaggerate the importance of maintaining and improving upon that position in the face of increasing competition. In practice, service to the consumer is largely a question of " making a good job " and keeping it so. In this respect engineers and others trained in the methods of applied science can do most valuable work by applying to the installation and maintenance of gas appliances, both industrial and domestic, the scientific technique and standards of efficiency acquired in the course of their training and experience.

Looking back over the last ten years one can record continuous progress in technical achievement that has improved service to the consumer. So far as the gas supplied is concerned, the removal of naphthalene and water has been a boon and a blessing; to-day the reduction of the sulphur content to the minimum and the practicability of greater uniformity of specific gravity and air requirements for combustion are receiving attention; and when the last traces of gum have disappeared the service and sales people will be more than pleased. On the supply side the significance of uniformity of pressure, as distinct from minimum pressure, is better understood, and I am glad to note that governors, especially on appliances, are coming into more general use—as are also thermostatic and other controls on, or in connection with, gas appliances. The standard of workmanship in the installation of gas appliances is improving, as indeed it must, to keep pace with the improvement in design and finish of the appliances themselves. And last, but not least, more and more undertakings are alive to the fact that maintenance of appliances on the district in good working order is essential.

Watson House.

Now, as I look forward to the pleasure of seeing you all shortly at Watson House, I think it may serve as a useful introduction if I describe briefly the work that is done there—especially because I am anxious that members representing the smaller undertakings should not be disappointed to find that a large part of what is done and many of the methods employed are not applicable to their own working conditions.

Watson House can only be seen in proper perspective when it is realized that the Gas Sales Department of the Gas Light and Coke Company is responsible for approximately one-sixth of the gas sales of Great Britain, and the technical co-ordination of sales on this scale necessarily creates a number of problems which do not exist in a smaller undertaking.

The introduction of a new appliance or fitting or method involves the passing of the appropriate technical information, not to a few dozen individuals to whom the matter can be demonstrated at one time, but to about 7,000 salesmen, foremen, and fitters; therefore features of Watson House which might be considered deserving of adoption by a small undertaking represent a small proportion of the whole. But although on a proportionate scale, small undertakings might calculate that not more than one or two individuals could be allocated to the kind of duties for which Watson House is responsible, I have no hesitation in saying that the creation of such a technical nucleus on utilization would be found to repay its cost very quickly.

The laboratories at Watson House are sub-divided to deal with a number of aspects of the utilization problem—such as cooking, lighting, chemical research, &c. It is the duty of each of the groups to keep technically up-to-date with all developments affecting its work, whether in the Gas Industry at home or abroad or in competitive or other industries. New materials, new fittings, new appliances are continually undergoing tests, and considerable assistance is given to the manufacturers in producing articles which will give good service and which will reflect credit on the Gas Industry at large. At the same time, fundamental research is continually in progress on such problems as heat transfer, combustion, comfort conditions, ventilation, &c.

Arising out of the work carried out over a period of years on ventilation, not only have the physics of the subject been thoroughly explored experimentally and mathematically, but also rules have been derived of general application to flues, while special flue fittings and ventilation methods have been evolved. The constant contact between Watson House and the district continually influences the research in the direction of practical results—which results are of value, I venture to suggest, not to the Gas Light and Coke Company alone, but to the whole of the Gas Industry in this country. Many new appliances, fittings, &c., have been developed at Watson House, most or all of them embodying in their design information derived from laboratory research without which such developments would at best have been " hit or miss," or might never have seen the light of day.

Some important developments have arisen out of the need for some new device; for example, a standard connection for flexible tube. A few years ago such a connection was designed at Watson House, and was so arranged that, when the plug was withdrawn from the socket, the gas was automatically cut off, thus eliminating the risk necessarily associated with the older type of push-on rubber end. In the interests of standardization throughout the Industry, and to avoid the confusion in which the Electrical Industry still finds itself over plug-in connectors, the fitting is now in course of standardization by the British Standards Institution.

You will appreciate that research in the laboratories could not continue if there were not a buffer between the laboratories and the multitude of daily district problems, and that much of the information given by the laboratories may be in a form unsuitable for digestion by the district

personnel. The responsibility for the interpretation of laboratory results into the form of specifications, and the subsequent testing of deliveries of the goods so specified, rests with the Testing Section, which is also centred at Watson House, and is in close contact with the laboratories. The number of items tested by this section over a year amounts to several million. As a result, it is rare that complaints are received regarding avoidable defects. Comparison of contemporary records with those of defects before the Testing Section was constituted show the most interesting contrast, and one which very fully justifies the cost of testing, even on the lowest basis of economy. As interesting examples of such tests, I may mention that all gas-passing fittings without exception are tested for gas tightness, standardization of screw threads is checked, the electrical conductivity of protected tubing is measured, glass shades are fracture tested, tap lubricant is analyzed, Brinnel tests are carried out on dies, &c.

The complementary section to the Testing Section is the Training Section. Parties of men come to Watson House from the district—fitters, foremen, showroom attendants, outdoor salesmen, and others—for periods of training lasting from half-a-day to two weeks, while staff pupils or trainees may remain at Watson House for a period of months. Apprentices pass the first two-and-a-half-years at Watson House, and return for further periods totalling six months before finally qualifying as assistant fitters. The rapid change in technique and in the design of gas appliances renders such training all the more necessary, and during the courses that take place demonstrations and lectures of general principles, as well as the handling of appliances and fittings by the men under training, are considered essential.

In order that the Gas Sales personnel may not lose touch with the latest developments between the periods of training, a monthly Technical Bulletin is prepared and issued—the circulation now reaching 6,300. I am often asked whether copies of this Bulletin can be supplied to individuals or bodies outside the Gas Light and Coke Company, and I always feel some embarrassment in refusing this request, though obliged to do so because the Bulletin is written for our own staff working to our own methods, and may easily be more hindrance than help if issued to a wider public, for which its preparation would present greatly increased difficulties.

Incoming telephone calls for assistance from the district are centred in the Information Bureau, working in close conjunction with the Training Section. It is frequently possible to give assistance directly in response to such calls, but where the matter is more involved expert personnel are sent out from Watson House on to the district to deal with the problem on the spot. The experience so gained is of great value in training, in the development of appliances, and in testing.

Finally, there is the Industrial Section, with which some of you will be familiar through the operation of the Regional Industrial Scheme. This Section moved to Watson House about two years ago, in order to bring its operation into closer contact with the work of the laboratories, &c. The benefit of this move has been very considerable, as shown by the increased throughput in the Industrial Section. Competition in this field, as you know, is intense, and success in the future depends largely on the development of the most efficient methods of utilization possible.

The standardization of gas quality, the flexibility of gas as a fuel, and the development of increasingly precise automatic controls, all suggest gas as the ideal fuel except for the crudest of heat operations. Our developments in the field are carried out in the closest co-operation with the manufacturers of furnaces and the like. It may happen that we have been the first to develop a new furnace or fitting as an improvement on the old type or as a means of developing a new application of gas, but we do not desire to manufacture such appliances in any quantity. Provided there appears to be a commercial outlet for a design, the various manufacturers are encouraged to undertake its production on their own account, so that its sale may be on the widest basis. Manufacturers are undoubtedly our best allies, provided we retain their goodwill; otherwise they remain potential allies of our competitors. One can claim with confidence that the most modern forms of gas industrial appliances in Great Britain are ahead of those in any other country in the world. But you will notice that this claim is qualified, because it cannot be made, I regret to say, about all the industrial gas appliances now in use.

The industrial load is an important one, not so much by reason of its present size as by reason of its potential growth. This growth may be seriously prejudiced if we allow to remain in operation industrial appliances which are below modern standards of performance and efficiency. The choice of fuels for industrial processes turns upon economic considerations, and comparisons between gas and its competitors can be damaging to the Gas Industry if for comparative purposes obsolete gas appliances are under review.

An appreciable part of the activities of the Industrial Section at Watson House is concerned with the withdrawal of old unsatisfactory gas apparatus and the substitution of more highly efficient modern apparatus, the immediate result of which may be a greatly reduced consumption. It is, however, a common experience for such substitution to be followed by the placing of orders for further apparatus on such a scale that the ultimate effect is a large increase in gas consumption for the factory as a whole.

I will not now take up your time by describing in any detail the various industrial developments or new applications for gas to which attention has been turned at Watson House. That can be better done during the coming visit, when we shall do our best to make such arrangements as will enable you to examine the things in which you may be specially interested.

Church Landmarks by Night

St. Anne's Church, Kew, floodlighted by 80,000 c.p. gas lights in celebration of the Richmond Youth Campaign. The installation was carried out by the Gas Light and Coke Company.

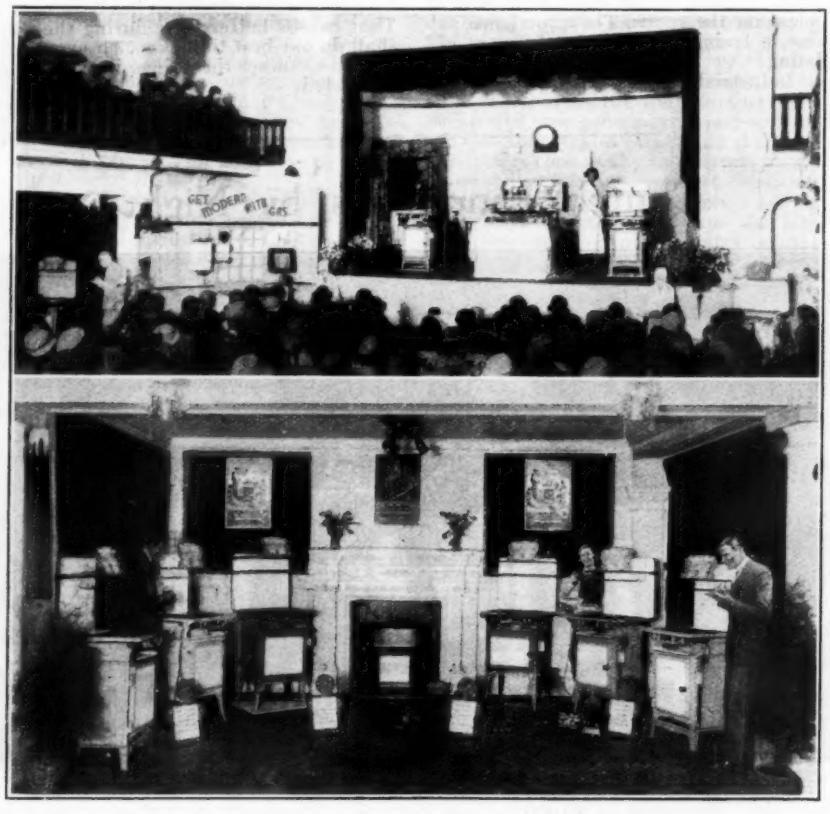
Mr. Therm at Home, with Richmonds "Newlyn" Heater.

SUCCESSFUL EXHIBITION AT FOLKESTONE

A most gratifying measure of success attended a Gas Exhibition just concluded at Folkestone. This event, which was arranged by the Folkestone Gas and Coke Company in conjunction with Richmonds Gas Stove Company, Ltd., was held in the Leas Pavilion—an attractively decorated and eminently suitable Hall situated in the most popular part of the town. Details were sent out to all consumers in the district inviting them to visit the exhibition and to attend cookery demonstrations which were held each afternoon and evening during the fortnight. The result fully repaid the effort made, and over 3,000 visitors availed themselves of the opportunity of seeing what the Gas Company had to offer and of learning the advantages of "Regulo" controlled cooking. The demonstrations were undertaken by Miss D. J. Baker, the Radiation lecturer, and included several complete dinners cooked in the "Bungalow" "New World" oven at one "Regulo" setting and time. On these occasions the oven was padlocked until the end of the cooking period. The subsequent withdrawal of the complete meals cooked to perfection and exactly "on time" never failed to elicit expressions of admiration and approval from all present. Another specially popular feature was the cake baking competition; and the high standard set by the 236 competitors made judging no easy task.

The hall itself was set out in a most artistic and pleasing way, and good sales were maintained throughout the fortnight. One of our illustrations shows part of the exhibit, which included "Bungalow" "New World" cookers, "Newlyn," "Equator," and "Don" water heaters, and a full range of Richmonds gas fires, including the new "Radiation" High Beam Fire, the "Flambeau," "Snappy" little "reader" cards featuring "Mr. Therm" were prepared by the gas undertaking, and some of these can be seen in the illustrations.

The Gas Company arranged all the lighting effects with great care and skill, and their efforts in this direction were much admired. A special section for gas refrigerators and also one for bye-products proved popular additions to a well-thought-out and arranged exhibit, which has undoubtedly been of much value to the Gas Company. The whole effort reflects much credit upon all who were engaged in the detailed staff work necessary when arranging a successful project of this kind.



COOKERS AND COOKERY OF TO-DAY.

Presidential Address

Of F. G. Shaw, Engineer and Manager, Buxton Gas Department.

[Manchester District Association of Gas Engineers, March 23, 1934.]

Gentlemen,—In delivering my address, my first duty is to express my great appreciation of the honour you have placed upon me by my election as President of this Association. I trust, with your support and assistance, together with the aid of the Committee and Secretary, Mr. Bridge, this important Association will, during my year of office, again confirm its great usefulness to the Gas Industry; and particularly may I express the hope that the improvement in trade will strongly develop to the general interest of all concerned.

In these days of rapid development, a Presidential Address cannot hope to be of more than temporary interest, and it is perhaps a good thing if this is recognized at the outset. I intend, therefore, to place before you observations on matters of general interest to the Gas Industry at the present time.

We are constantly, and rightly, urged to co-operate in various schemes and enterprises for the progress of the Industry. This I heartily support—but with one important reservation—there should be no reduction in individual effort. The practice of inventive ability on the part of each gas engineer and manager has been so fruitful a source of knowledge and success in the past and, if we can retain it, will prove even more valuable in these times of rapid change.

Individual Effort.

The objects of this Association depend for their fulfilment on the communication of the results of individual effort and invention for the advancement of the Gas Industry. It is the duty of every member to add his contribution to a worthy record. The wide range of important subjects dealt with by the Commercial Sections together with the valuable information communicated at the monthly meetings necessitates the regular attendance of all who desire to render full service to their undertakings.

The district covered by our membership—viz., Lancashire, Yorkshire, Cheshire, and North Derbyshire—is one of the most important gas consuming areas in the United Kingdom. Approximately 20% of the total gas sold is consumed in our district.

It is unfortunate that the depression in trade has, over a period of years, particularly affected the great staple industries of this district. There is no more convincing proof of the inherent value of town gas to the community, and the efficiency of those directing its fortunes, than the way in which business has been held under such difficulties.

During the trade depression the attention of the local authorities has been directed to the importance of attracting new industries to the various centres, and, as a result of inquiries, I am confident that the importance of the local gas supply, as a service to industry generally, is being more emphasized and recognized. I know it has been a matter for re-consideration on the part of some authorities, who had not previously assessed the value of gas supply very highly in finding its importance stressed by manufacturers.

The contribution which the Gas Industry is rendering to smoke abatement is being more fully realized by the members of both local and national governing bodies.

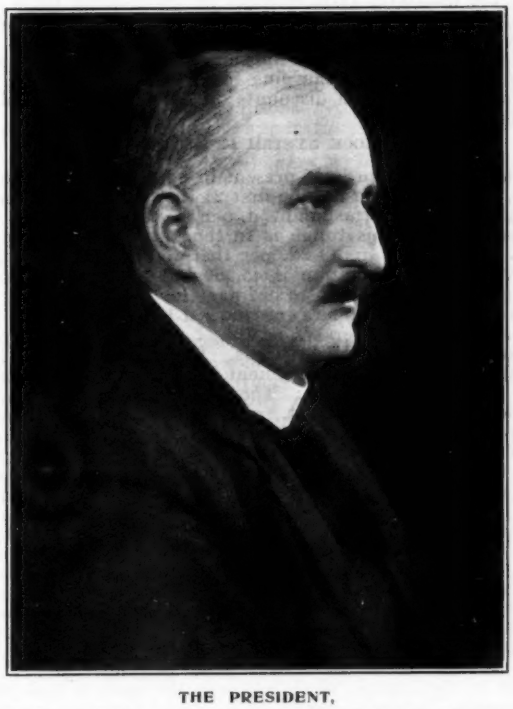
The Gas Industry and National Security.

The place of the Gas Industry in regard to national security cannot be overlooked. To-day business is a matter of politics, and the Gas Industry should follow many excellent examples in making its voice heard. I will content myself by observing that Government intervention and control is operating in many industries, including electricity and the coal trade. The Road and Rail Traffic Act and the setting up of the London Passenger Transport Board indicate that the regulation of competition in the public interest is now practical politics.

Our supplies of coal are drawn from an industry working under a Government scheme, while we have to face the competition of a rival service with similar backing. Is there not a danger of preference to our disadvantage under present conditions?

During a previous crisis in national affairs, resulting from the effects of the war, the Gas Industry accepted a National Scheme of evaluating and charging for gas on the therm basis, as a condition of legislative relief—*i.e.*, the Gas Regulation Act, 1920. In view of prospective legislation in our interests, what will be the conditions under which it will proceed? If anything in the nature of a National Gas Grid Scheme is contemplated, the district we represent has a working example. Out of the 75 thousand million c.ft. of gas manufactured in the counties of Lancashire, Yorkshire, Cheshire, and Derbyshire, 10·3 thousand million c.ft. are supplied by coke ovens to gas undertakings for distribution.

In our area, a large number of gas undertakings are owned by local authorities, and of these a very substantial proportion of the municipalities own both the gas and electrical undertakings. With the linking up of electrical undertakings under the grid scheme it is, therefore, a matter of some concern that the great differences in the basic economics of the two industries should be properly understood. The erroneous conclusion that a system which is good for the one is certain to be of equal value to the other should be contested.



THE PRESIDENT.

F. G. Shaw, Engineer and Manager to the Buxton Gas Department.

On leaving school Mr. Shaw had some preliminary experience with his father, who was a Member of the Institution of Water Engineers, and also with Mr. R. W. Smith-Saville, Assoc.M.Inst.C.E. He entered the gas profession as a pupil to Mr. Alex. H. Smith, Engineer and Manager at the Darwen Gas-Works. After 7 years as Assistant Gas Engineer and Manager at Darwen, he was appointed in 1911 to his present position of Engineer and Manager of the Buxton Gas Department. Mr. Shaw was elected a member of the Institution of Gas Engineers in 1914.

There is no doubt that it is urgently necessary that many gas undertakings, with an output less than 25 million c.ft. should, if possible, link up with neighbouring larger undertakings in order to provide the service to their consumers which modern conditions demand—a service which they are too small and financially weak to render. Beyond this, the remarkable fact remains that the size of the undertaking is not always in inverse ratio to the price it charges for gas. Undertakings of quite moderate size succeed in maintaining a very level position with the largest undertakings. For example, in this district the low price of 5·6d. per therm to ordinary consumers is charged by an undertaking with an annual make of 64 million c.ft.

Factors Governing Price.

The charges for gas in each undertaking are so influenced by a variety of conditions—viz., capital expenditure, cost of coal and carriage, receipts from residuals, &c., quite apart from the type of carbonizing plant and its operation—that much injustice can be done by unfavourable comparisons being made by those who do not acquaint them-

selves with all the facts necessary in comparing one undertaking with another. Then, again, the distribution cost and the average consumption of gas per consumer vary in different areas, due to local circumstances. The burden of capital charges is often so heavy as more than to neutralize the low cost into holders effected by the expert operation of the best modern plant. I am very appreciative of this point, as, by careful conservation of expenditure out of capital over a period of years, the total debt on the Buxton Undertaking has been reduced to £4,166 on March 31 last.

With a view to obtaining a high consumption per meter, having regard to local circumstances and the loads specially desired to secure or retain, the engineer and manager of each undertaking has the responsibility of advising on the most suitable scheme of charging for gas. Many solutions to this problem have been invented and practised by members of this Association with success, but in considering the adoption of any of them, one finds it difficult to assess how much of the success is due to the scheme and how much to the zeal and ability in salesmanship of the management and staff. This leads to the thought that the introduction of a two-part tariff system of charge, by giving the gas salesman a most valuable addition to his equipment, may be well worth adoption from that standpoint alone. It is a beginning to a more just allocation of costs between consumers if meter rents are charged. These can be merged into the quarterly tariff charges on an optional tariff system. One difficulty is to find a scheme which provides some easy solution in the case of the prepayment consumer.

On ordinary lines there appears to be a definite leaning to a block system of charging for ordinary consumers, together with extended discounts on the prepayment collections.

Block System at Buxton.

The block system is at present in operation in Buxton—viz., 8¼d. per therm for the first 24 therms; 7¾d. per therm for the next 96 therms; and 7½d. per therm for all additional consumption. This range is further extended for special uses down to 6d. and 4·2d. per therm. The average ordinary meter consumption is 45,500 c.ft., or 218·4 therms. Meter rents are charged to ordinary meter consumers.

Prepayment consumers are charged 11·5d. per therm, less a discount of 1½d. per 1s., or 12½%. This discount is paid annually, just before Christmas. In my opinion this is a valuable feature, as the payment is made in the showroom, and good business results. The average prepayment meter consumption is 19,850 c.ft., or 95·3 therms, and discount averages 11s. 3d. per consumer. Cooker hire is charged to prepayment consumers at the rate of 9d. per quarter.

A Corporation housing scheme of 142 houses, parlour and non-parlour type, having double burner ovens, wash-boiler and electric lighting, averages 96 therms per prepayment meter per annum. A small scheme of non-parlour type houses, with electric lighting, but having a gas-heated water supply, of the wash-boiler type, with ground floor bath, averages 76·8 therms. The same type of house with coal-fired back-boiler water system, and electric light averages 72 therms. These houses are fitted with single-burner oven gas cookers and wash-boilers.

It is regrettable that many good housing schemes are spoilt by the absence of chimneys in the scullery and some bedrooms. Support should be given to any organization which aims to remedy this state of things in the future.

I have adopted the method of regularly checking domestic consumers by taking a consumption of 15 therms in the March quarter only, as a datum. On the last computation, the Buxton Undertaking had 146 ordinary consumers, out of a total of 2,024, below this level of consumption. Of these, 37 had gas cookers. Out of 2,455 prepayment consumers, connected for a full year, 125 were below the datum; of these 47 had gas cookers installed. Such instances as these are given special attention with the object of increasing the consumption.

Sales Development and Competition.

The consumption of gas through prepayment meters is undoubtedly of great benefit to both the undertaking and the consumers; the latter greatly valuing the convenience of payment and the service rendered. From the Gas Undertaking's standpoint, the difficulty is that the average consumption per meter is controlled largely by the very factor which has brought the system into such extended use. In my experience, the price of gas within reasonable limits does not materially affect the prepayment meter consumption on the ordinary gas lighting, cooker, and wash-boiler service. It does, however, considerably affect the position when it is desired to increase the average consumption by installing gas fires.

Electric lighting does not appear to reduce the consumption per prepayment meter in Buxton by more than 18 therms per annum.

In considering a sales policy, with respect to gas charges, one is constantly up against the problem crudely set out in an old catch question, "Which would you rather have—a profitable or a large business?" Obviously, the nearer the profitable price of gas approaches the price of coal on thermal efficiency a wider extension of the sales field is disclosed.

I venture to assert that much of the growth of gas and electricity supply is due not to economics, but to convenience and ease of utilization. A stage has now been reached in gas and electricity development in which both services have a large and profitable business, based mainly on convenience of the product which is available instantly on demand. A large further extension on the old lines is not readily obtainable.

The competition of oil, though inferior in convenience to gas and superior to coal, has to be met in large-scale industrial heating. As a rule, the calculation of the price of gas, to secure the business, has to start at the net cost into holders and finish nearly where it begins. To secure such business from oil it should be possible to obtain some concession on the price of coal represented by the oil displaced. The coal trade is particularly concerned in combating this competition.

The oil trade can, by virtue of international markets, proceed to conduct a considerable business in one country on a very narrow margin, making up its profits by cartel and pooling arrangements where there is no competition or import tariffs. Further, there is the possibility of recovering losses on heavy oil from the petrol and lubricating oil business.

The trade depression has undoubtedly intensified the competition between gas and electricity for the domestic load. It is interesting to note that the electrical industry obtains 60% of its revenue from lighting and domestic load, representing 32% of the total units sold. The electrical power load is held on the basis of a cost delivered price *plus* very small margin. As this load represents 57% of the total units sold, it is easy to understand the competition of the electrical industry for lighting and domestic load.

If, instead of allowing the electrical industry the initiative, gas was sold at a specially low price for lighting purposes, it is possible, with the latest gas switching systems, that a considerable portion of the lighting load could be retrieved. I suggest that the wide adoption of a low gas lighting tariff would have a considerable effect, both direct and indirect, on competition. (The special price could be given by way of assessment to domestic consumers.) It is not essential that a large amount of business should be obtained for this to operate to our advantage. A return to private gas-driven automatically operated electrical generating plants for large consumers, is possible by adopting, for this purpose, a system of low charges based upon the number of units generated.

The Domestic Cooking Load.

The domestic cooking load is one of great importance, and it is affected by the rapidly changing conditions of living. These all tend to a reduction in gas consumption by the householder. Here are a few instances illustrating this point:

(1) Considerably more people take their mid-day meal at restaurants or at work, due to housing having extended to outlying districts. While this has the effect of reducing gas consumption by the householder, it does not by any means increase restaurant consumption in an equal proportion.
(2) A larger use of tinned and ready cooked foods.
(3) Week-end motoring, rambling, and picnic parties.
(4) The decline in home-made bread and cake baking.

These instances, and many others, all have an influence on the size of gas cooker used by consumers.

In Buxton, an analysis of cooker complaints revealed faulty oven burner regulation, in cookers with double-burner ovens, as responsible for over 50% of the complaints received. The introduction of the single-burner oven cooker (with or without thermostatic control) was considered a means of reducing maintenance. In Buxton, out of 2,900 cookers in use, 1,300 are of this type.

It is important in the design of the hotplate that the great advantage of speed should not be sacrificed to economy. I now insist that there should be one hotplate burner capable of 10,000 B.Th.U. per hour at 20/10ths. The hotplate burners should be tested for stability of flame when turned low. Some burners, quite good otherwise, will not permit of tap regulation to low consumption.

I advocate the fitting of flue piping to gas cookers where practicable, particularly in the small sculleries generally provided in modern housing schemes. The all-enamel cooker with thermostat is sold for cash and hire purchase.

The choice of a cooker as a standard for simple hire is a most important matter; the question of cost should not be

a primary consideration. Cookers for this purpose should be constructed to withstand rough and careless usage.

A black single-burner oven cooker, with enamelled door, prepared to receive a thermostat, enamelling, &c., later, is used for simple hire. This type of cooker reduces the consumption of gas, on the average by about 25%, due to the more economical oven and improved hotplate.

Cookery Lectures.

To make up for the more economical operation of modern cookers, it was decided to encourage home cooking by a regular series of cookery lectures.

Experience with fortnightly sessions of cookery lectures, held in the spring of three consecutive years, resulted in the decision to adopt two weekly sessions, one in spring and the other just before Christmas. These are held in the demonstration room attached to the showroom. Bread-baking competitions are arranged in the spring session and cake-baking in the Christmas session, attractive prizes being awarded for each competition.

A particular feature is made of these lectures, which are very popular. The following is a list of average number of persons attending each lecture:

Fortnightly Session.	Spring.
1925	74
1926	82
1927	58

Weekly Session.	Spring.	Christmas.
1928	97	125
1929	57	92
1930	69	105
1931	70	112
1932	127	128
1933	85	162

Entries for the competitions have steadily increased, the last figures being: bread-baking 82 and cake-baking 94. It is of interest to note that users of cookers with single-burner ovens have gained over 50% of the prizes in these competitions.

The lectures are held specifically to promote the use of gas cookers, and the benefit obtained has been sufficient to maintain the cooking load.

Gas Fires and Radiators.

In Buxton over 3,200 gas fires have been purchased outright. For hotels and boarding houses hire purchase is available for both gas fires and prepayment gas fire meters. Where a gas fire is fixed for prepayment consumers a safety cut-off valve is fitted. In my experience, this class of consumer does not appear to average 9 therms per fire a year additional consumption. Usually it is possible to persuade such consumers to transfer to the ordinary meter, with satisfactory results.

In most small houses, with ordinary meters and two gas fires already in use, it is found that little consumption is gained when additional fires are fitted. This feature is also particularly marked in the local hotel and boarding house business. In a small hotel with, say, 40 bedrooms, it is fairly true to state that after half the rooms are fitted little increase in consumption will result from completing the whole. At present, simple hire terms do not appear to be justified for this business.

A generous allowance is made on old fires in the purchase price of new models when a consumer desires a change. This is only done on high-grade models having seven or more radiants.

During the depression in trade the reduction in the consumption of gas, by economy in the use of gas fires, has been particularly noticeable. The sale of gas fires has kept up to the average, however.

A point may be raised with regard to the heating of occasional rooms, such as small sitting rooms, studies, &c.; important developments may result from the incorporation in the gas fire of a small independent air heater consuming about 3 c.ft. per hour. The products of combustion to pass into the gas fire flue while the heated air must be delivered in such a manner as not to be drawn up the flue. Such a device could be constantly in operation in the winter months at small cost to the consumer, and would maintain that "lived-in" atmosphere.

It would be easier to induce people to keep such a device in constant operation than to use the gas fire, or a portion of it, regularly in an unoccupied room. In addition, the heating effect of the gas fire would be accelerated.

The introduction of more carefully designed types of luminous gas radiators, together with the reduction I have been able to achieve in the sulphur content of the gas, has rather changed my views on the desirability of encouraging this method of heating. Recent experience with the new types of radiators has been very satisfactory.

Gas for Domestic Hot Water Supply.

This branch of our activities requires very considerable care if setbacks are to be avoided. In large establishments, at ordinary rates for gas, auxiliary hot water apparatus to supplement the general supply appears to be the most satisfactory business at the present time. In the smaller houses and flats the most satisfactory domestic hot water business at present results from the use of the modern low-consumption storage type heaters on simple hire. The revenue is satisfactory without being regarded as too costly by the consumer.

I attach considerable importance to the maintaining of any point where gas has no rival—viz., the instantaneous type of multi-point geyser. It is usually necessary to install a larger service and meter, and provide a flue-pipe; this expenditure is more than covered by the wide range of service given by the apparatus.

After experiment, I have decided that the small type storage water heater or the small geyser offers the best prospects of increasing sales through the prepayment consumer. The storage type is estimated to increase consumption by 25 therms per annum. Various makes have been in use on the district, and I find there is a considerable difference between them from the point of view of maintenance. I suggest it is necessary to test these heaters on the district for a time before deciding on the particular makes suitable to local conditions. A safety cut-off valve should be provided with the apparatus.

Meters.

One of the features of distribution is the concentration of new consumers on the prepayment meter. This is also equally marked in electrical supply. There is a diversity of opinion as to the adoption of the high-capacity meter in place of the standard meter. So far, I have kept to the standard. There is no doubt that the low pressure absorbed by the high-capacity meter gives it an advantage. It is remarkable how prepayment meters, of various makes, vary in this respect after some time on the district. The dual coin meter, taking either coin, at the consumer's option, is now very favourably reported on. I am convinced that paraffin spraying, as practised at Buxton, definitely lengthens the life and maintains the efficiency of the meters.

I consider it is very important that meter manufacturers should inform their customers of any technical change made in leather curing and dressing, stuffing-box packing, grease cup filling, &c., and not risk a change without notice.

Pressures.

As a result of re-laying and enlarging the mains in Buxton, during the past ten years, a very even range of pressures can be given to the consumers. A new 12-in. diameter welded steel main was laid, together with an air loaded 12-in. diameter automatic district governor. This main was tested at high pressure, but is only being used for the time being at a pressure of 6 in. W.G. The pressures in the two old 12-in. mains supplying the district are reinforced by this steel main, which is connected to the cast-iron mains at a point beyond their maximum load. It is therefore possible to give a mean pressure of 40/10ths. At the times of maximum consumption a pressure of 43/10ths is given and 37/10ths during the time of normal consumption. From midnight to 5 a.m. the mains are kept at 32/10ths pressure. The mean pressure of 40/10ths was decided on because of the noise from lighting burners when this pressure is exceeded.

Judging by the large number of undertakings which have adopted similar schemes of maintaining even pressures, one is led to think that the older method of controlling pressures solely from works governors or boosting is being displaced by this system.

The provision of a governor on each piece of apparatus may be necessary in the future. This, from many points of view, is preferable to the fitting of service governors.

In Buxton it is the practice to lay a free service if three gas points are provided in new houses by the builder.

Maintenance of Domestic Appliances.

During the discussion on the excellent paper on "Gas Service," given by Mr. Canning in 1927, I stated that I had been faced with the question, "Are we going to take the whole of the work entirely off the consumer, or are we going to do that necessary amount of work for the consumer which will help him to maintain his apparatus in reasonable order?" I must confess, the only answer I

find practicable is to divide consumers into sections and render the appropriate service.

In my experience, one-fifth of a penny per therm is the minimum additional cost at which reasonable maintenance can operate. This will not provide for cooker overhaul and cleaning in the workshops, and only covers demonstration cleaning to show the consumer how to proceed. It also provides two visits a year to the smaller houses not having water heaters, quarterly visits to the larger houses, hotels, restaurants, houses having water heaters, &c., and three visits during the autumn and winter months for gas lighting maintenance.

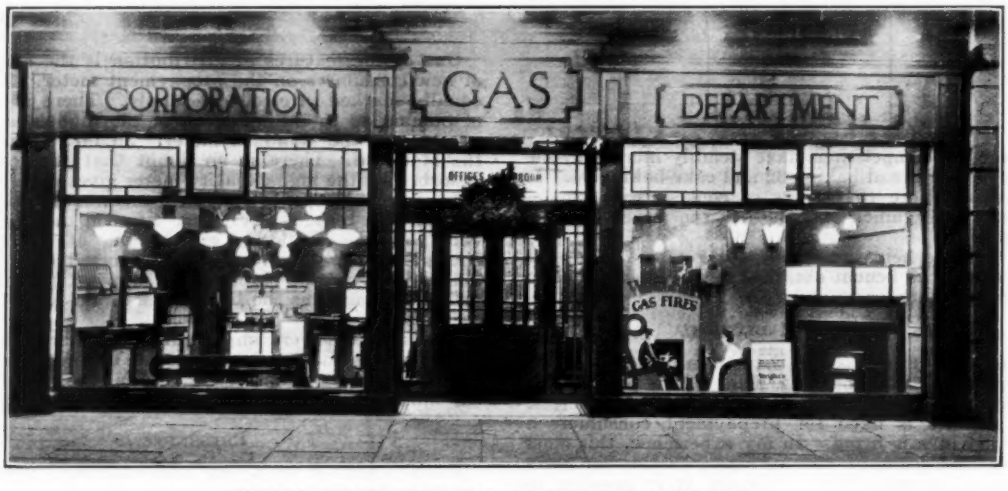
In Buxton, it is our practice to replace broken gas fire radiants free on the autumn maintenance rounds. I advocate the free supply of lighting burners—the consumer to pay for mantles and glassware. The occasional free distribution of tins of cooker cleanser saves costly maintenance service.

In Buxton the maintenance work is done by first-class fitters with handy-men assistants. I find that all classes of apparatus can be reasonably maintained, without duplication of visits, on the system of house-to-house rotation.

Buxton Gas Showrooms.

In 1924 an old hotel, fronting on the market place, was converted for the purposes of the Gas Department into showrooms, office, lecture and demonstration room, Engineer's offices, distribution stores and workshops, meter testing room, and three flats.

The showroom has a floor area of 1,100 sq. ft. and is provided with two large display windows.



BUXTON CORPORATION GAS DEPARTMENT SHOWROOMS.

The main entrance has a revolving door, which has proved a great success in the very elevated and windy position of the building. The office adjoins the showroom and members of the staff act as salesmen.

The lecture and demonstration room is 37 ft. 6 in. long by 29 ft. wide by 14 ft. high, and has a platform 13 ft. by 6 ft. by 1 ft. 9 in. high. This room is situated immediately above the showroom, through which persons have to pass, to and from the cookery lectures, &c.

The three flats are occupied by the storekeeper, a main and service layer, and a gas fitter respectively. When the showroom is closed, the telephone is connected to the storekeeper's flat for emergency calls; we are thus able to offer a 24-hour service to our consumers, which is highly appreciated.

Gas fitters are constantly reminded of their duty as salesmen for their influence on the consumer is very great.

Showroom window displays provide opportunities for the originality and ingenuity of the staff to provide that frequent change desirable. It is very difficult to assess the appeal of these displays, but if people make a habit of crossing the street or halting to look in the windows as they hurry along, the advertising value is assured. Many undertakings in this district maintain a high standard of showroom window display; I suggest that there is scope for the interchange of such displays between undertakings.

Publicity.

There is no need to dilate upon the good work of the B.C.G.A. and particularly of the "Mr. Therm" series, which has very effectively caught the popular eye. A point might be made of the undoubted differences in outlook of the population in the various, strongly localized, parts of the country—*e.g.*, Lancashire and Yorkshire as compared with the London district. Whether the B.B.C. will ultimately succeed in giving the population of this country uniformity of outlook, speech, and reaction to publicity is a matter of opinion.

I suggest that the opening of a branch office of the B.C.G.A. or the appointment of a district advertising expert might lead to very general satisfaction.

Composition of Gas.

While the question of calorific value appears to be settling in the region of 450 to 500 B.Th.U. for the majority of undertakings, the question of gas composition does not appear to have had that investigation and attention which I believe to be desirable. With the increasing efficiency of various appliances and new uses for gas, the problem of condensation from the products of combustion calls for attention.

In my opinion, there is a very narrow limit between very little and a great deal of trouble from condensation. In some situations the air circulating through the appliance is charged with moisture to such an extent as to prevent the removal of the water vapour products of combustion. The percentage of hydrogen in the gas and the removal of hydrocarbons appear to affect the position. Research should be directed to this problem.

Attention should be given to the removal of sulphur compounds from the gas; this is also of advantage in minimizing condensation. The sulphurous and sulphuric acid, resulting from the burning of the sulphur compounds, have a marked hygroscopic effect and bring down condensation which would otherwise be dispersed.

In conjunction with gas oil washing for the removal of naphthalene (commenced in 1923), I have been endeavouring to improve the efficiency of extracting sulphur compounds in the one operation. The second half of the one million per diem Holmes' washer scrubber is isolated and used for oil washing purposes, the first half, taking the inlet gas, being used for ammonia removal. Approximately 28 gallons of oil are used per million c.ft.

Tests made with the Gas Referees sulphur testing apparatus at present vary between 8 grains and 15 grains per 100 c.ft., an average reduction of about 18 grains.

South Yorkshire screened gas coals are carbonized in horizontal retorts.

Paraffin spraying on the outlet of the gasholder supplying the district has been continuously practised for 19 years.

The type of plant used is shown in fig. 1.

The jet is fitted in the gasholder standpipe, and paraffin is sprayed through a Kortings or other type of jet, at the rate of 10 gallons per hour under 30 lbs. pressure. To avoid the danger of flooding the standpipe, the amount of oil in circulation is limited. After a few hours' spraying, the oil in the sump is pumped back into the tank, any entrained water removed, and the spray re-started.

An average of four gallons of paraffin per million c.ft. of gas is carried forward.

By using compressed gas and a measured drip of oil, a larger distribution of paraffin takes place, but the method used at Buxton has, however, the valuable effect of

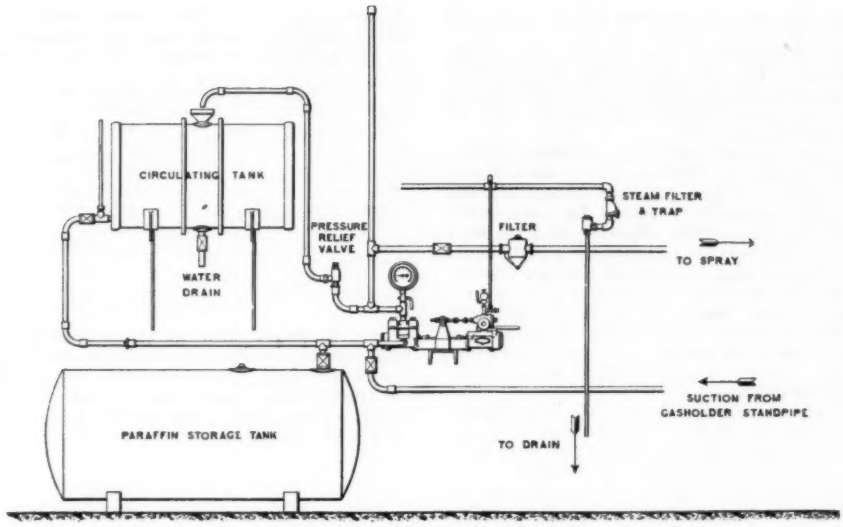


FIG. 1.—ARRANGEMENT OF PARAFFIN SPRAYING PLANT.

mechanically bringing down water from the gas in the holder standpipe and in main syphons adjacent to the works. Very little water has to be removed from the other syphons on the district. Other benefits resulting are the internal oiling of the distribution system and meters; taps and cocks on apparatus are also kept free from sticking.

It is not my intention to refer to carbonizing plant, &c., in this address; there are, however, one or two important matters I should like to refer to.

Coke.

Considerable attention is now devoted to improving the value of coke as a fuel for the domestic fire. Although I am aware of the benefits of coal-blending, it appears to me that an artificial increase in the volatile matter in coke would increase desirable properties such as ignitability, controlled combustion, &c. Such a method offers a prospect of improving the value of coke without altering carbonizing practice.

The great weakness of an open coke fire is lack of control as compared with a similar type coal fire using a first-class house coal.

All cokes or semi-cokes I have tried have this defect. It seems to have been generally accepted that the residual volatile matter left in coke by incomplete carbonization is necessarily the best; but experiments I have made with coke treated with various oils lead me to the conclusion that this is by no means the case, if certain difficulties such as odour from the treated coke, &c., can be overcome.

I must congratulate the Institution Coke Research Committee on the interesting experiments they have carried out in spraying coke with road tar and afterwards coating with coal dust. I hope, in the financial interests of the Industry, that these experiments will be continued and a wide range of oils be experimented with, including chemically treated emulsions. The hydrogenation process considerably adds to the range of suitable oils, and, even if it is ultimately found that an oil originating outside the Gas Industry can give us an oiled coke that not only ignites very easily but maintains a clear flaming combustion for a period, it will be of great commercial value to the Gas Industry.

Tar and Ammoniacal Liquor.

Tar prices at the present time are subject to product price fluctuations, due to adverse rates of exchange. The increased output of tar from the coke ovens, due to the improvement in the iron and steel industries may also have an adverse effect.

Under present commercial conditions, the disposal of ammoniacal liquor through the sewers was considered, and experiments were made with a view to discovering if this could be done locally without difficulty.

The experimental plant was in two sections and built to $\frac{1}{1000}$ scale with the sewage works equipment. One section of the plant treated crude sewage only and the other section crude sewage *plus* a proportion of crude ammoniacal liquor. The flow was 700 gallons per day on each section.

The effluents from this plant were regularly tested with very encouraging results. I was convinced that a full-scale experiment would give improved figures, and after prolonged negotiations it was decided to allow a restricted quantity of crude ammoniacal liquor to be turned into the sewers. The rate of admission is entirely under the control of the Sewage Works' Manager.

The feed arrangements consist of a 100-gallon cast-iron tank fed with liquor from the works' overhead storage tank through a float valve. The discharge to the sewer is at the rate of 1,000 gallons per day through a small drilled hole in a malleable iron cap.

These experiments have been carried out during the worst possible conditions, due to exceptionally dry weather seriously depleting the sewage works' flow. The marked success attained should be useful to others in similar circumstances.

Analysis of strong crude ammoniacal liquor:

Ammonia	2·65%
Total sulphur	0·41,,
Phenol bodies	5·5 m.grm.%

The following are some results which are of interest:

Average Sewage Works' Results for 12 Months prior to April 19, 1933.

—	Oxygen Absorption in Four Hours. Parts per 100,000.	Parts per 100,000. Nitric Nitrogen.	% Purification.
Crude sewage	4·840	..	..
Final effluent	0·598	1·43	87

From April 19, 1933, to March 1, 1934, the whole of the ammoniacal liquor produced from the carbonization of 10,200 tons of coal in horizontal retorts, was admitted to the sewage in a regulated flow.

Average Sewage Works' Results from April 19, 1933, to Mar. 1, 1934.

—	Oxygen Absorption in Four Hours. Parts per 100,000.	Parts per 100,000. Nitric Nitrogen.	% Purification.
Crude sewage	6·060	..	..
Final effluent	0·626	2·04	89

Mr. Oliver, the Sewage Works' Manager, gave a paper on this subject at the January meeting of the Institute of Sewage Works' Managers (N.W. District). This, together with the discussion, has been published in the *Surveyor* of Jan. 19, 1934.

May I be allowed to give a word of warning? The day when liquor can be indiscriminately dumped is now long past.

Gasholders.

At the outset I would say that the old standard of 24 hours' storage, based on maximum output, is as essential as ever.

It is a matter of congratulation to this district that it has, at Skipton, the largest static gasholder at present working under pressure. This pattern of holder will certainly receive greater attention in the future. There is, undoubtedly, public prejudice against the erection of very lofty industrial structures in certain localities; the static

type of holder is one way out of a serious difficulty in such instances.

The older pattern of gasholder—the spiral—still maintains a strong position. The low prices for manufacture and erection, consequent upon the reduction in costs during the last few years, are now about their lowest, and an increase in prices may be expected.

With the low prices current last year, I replaced the two-lift spiral-guided holder at Buxton with a new three-lift spiral holder of half a million c.ft. capacity, utilizing the existing steel tank (originally designed for a three-lift holder), the latter being adequately strengthened to meet the new requirements. The existing gasholder was 31 years old, and considerably weakened by corrosion of the sheets, notwithstanding regular attention and painting it had received. The material was steel, of light gauge, and appeared to be similar in quality to that used in many gasholders erected about the same period—*i.e.*, basic bessemer steel (imported). Most of these holders have required resheeting during the last few years.

The following are the reasons why B.S.S. Siemens-Martin steel was specified for the new holder. The period of manufacture of steel by the Siemens-Martin process extends over 10 or 12 hours, thus permitting of very rigid control which results in a steel of uniform structure. In the bessemer process, the period of conversion from pig-iron to steel is only 20 minutes to half an hour, and consequently the time for rigid control is not available. This often results in spongy and honeycombed ingots which, although compressed together in the subsequent rolling process, leave a finished material of a non-uniform character. In this condition the steel is more subject to the attack of corrosive influences.

With the facilities available in this country thoroughly to inspect the material, together with the tariff on imported steel, the gas engineer to-day can be more confident in the use of steel than at any previous period. Thirty years ago, holders were designed to throw the minimum amount of pressure, whereas to-day, conditions in this respect are entirely different. In many cases the inner lift is required to give a pressure very nearly equal to that of the fully inflated multi-lift holder of the past.

Buxton Holder.

The inner lift of the Buxton gasholder was required to throw a pressure of 6 in. W.G., the necessary weight being placed in the fabric of the structure. The pressure thrown when the holder is fully inflated is 12·3 in. W.G.

The dimensions are:

Inner lift	.	.	95 ft.	0	in.	diameter	by	24 ft.	0 in. deep
Middle lift	.	.	97 ,,	6	,,	,,	,,	24 ,,	0 ,, ,,
Outer ,,	.	.	100 ,,	0	,,	,,	,,	24 ,,	0 ,, ,,

The plates used in the construction are as follows:

Inner Lift Crown.—Centre crown plate $\frac{5}{16}$ in. thick, next ring $\frac{1}{4}$ in., intermediate rings $\frac{3}{16}$ in., and the curb ring $\frac{5}{16}$ in. thick.

Inner, Middle, and Outer Lift.—Top rows $\frac{1}{4}$ in. thick, intermediate rows $\frac{3}{16}$ in., and the bottom rows $\frac{5}{16}$ in. thick.

The cup and dip skirting plates, in each case, are $\frac{5}{16}$ in. thick. All the material was tested and inspected by Lloyds' surveyor. The water overflow pipes and flooding holes employed on the dips and cups are shown in fig. 2.

The following carriage loads may be of interest:

[Wind pressure taken at 35 lbs. per sq.ft. Snow load taken at 5 lbs. per sq ft.]

—	Number of Carriages.	Wind Load.	Snow Load.	Max. Carriage Load.
		Tons.	Tons.	Tons.
Inner lift	10	0·88	0·67	1·55
Middle lift	15	2·35	0·45	2·80
Tank	20	4·03	0·33	4·36

Strengthening the Tank.

The facilities given by electric welding for the alteration and strengthening of existing steel structures are well known; it may, however, be of interest to give an account of the welding work done on the existing steel gasholder tank. This tank is 102 ft. diameter by 24 ft. 6 in. deep, and was erected in 1901.

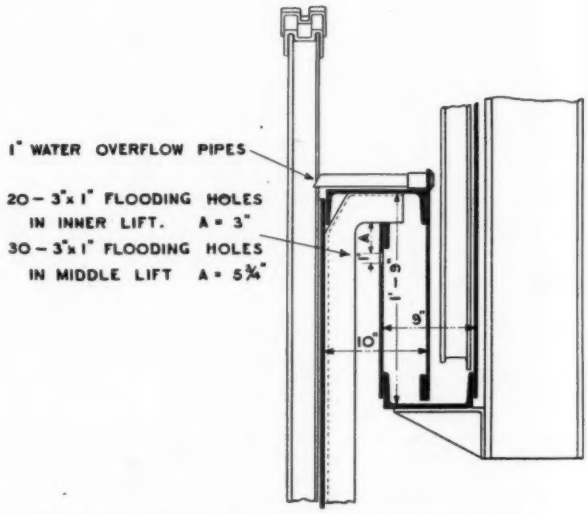
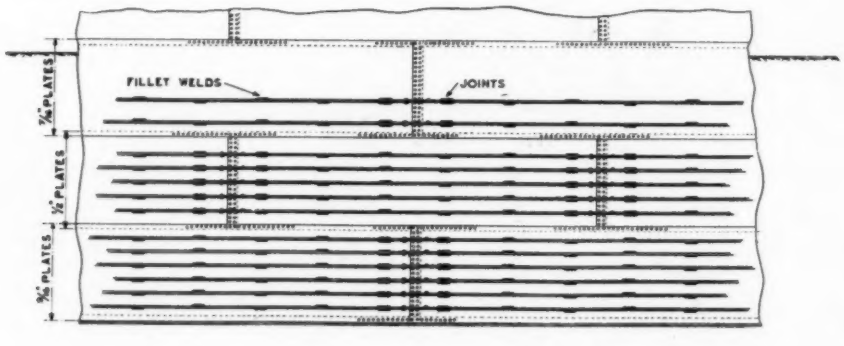


Fig. 2.—Cross Section of Cup and Dip, showing Water Overflows and Flooding Holes.

Pieces of plate cut from the tank were tested by Lloyds' proving house and gave the following results:

Test No.	Tensile Strength. Tons per Sq.In.	Percentage Elongation in 8 In.	Remarks on Fracture.
1	27·74	27	Silky
2	28·00	30	,,



ARRANGEMENT OF WELDED BARS ON THE THREE BOTTOM RINGS OF TANK PLATES.

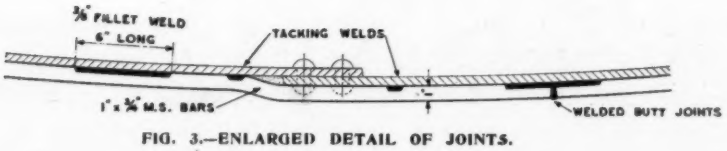


FIG. 3.—ENLARGED DETAIL OF JOINTS.

On the three bottom rows of tank plates the double rivetted lap joints gave a lower factor of safety than thought desirable, and it was therefore decided to electrically weld M.S. bars of 1 in. by ¾ in. section continuously round the tank. The bottom row of plates has 6 bars, the next 5, and the third row from the bottom 2 bars. These bars were butt welded and attached to the plates at intervals by ⅜ in. fillet welds 6 in. long. Coated steel electrodes were used throughout. The bars were specially rolled and cranked, at the mills, to clear the lap of the joints. The section of bar used was decided on to avoid distortion of the tank plates by contraction after welding.

The arrangement of the bars and an enlarged section of the joints are shown in fig. 3.

After considerable investigation, the design of tank balcony finally adopted is shown in fig. 4.

The top row of tank plates, originally 5/16 in. thick, was replaced by plates ⅜ in. thick, with a composite top curb formed of 4 in. by 4 in. by ½ in. L, 5/16 in. plates with 4 in. by 3 in. by ⅜ in. T platform jointers at 8 ft. centres, and 6 in. by 3 in. by ½ in. T outer curb. Handrail stands of 3 in. by 3 in. by ⅜ in. L, cranked back to the tank side, are also fitted at 5 ft. centres.

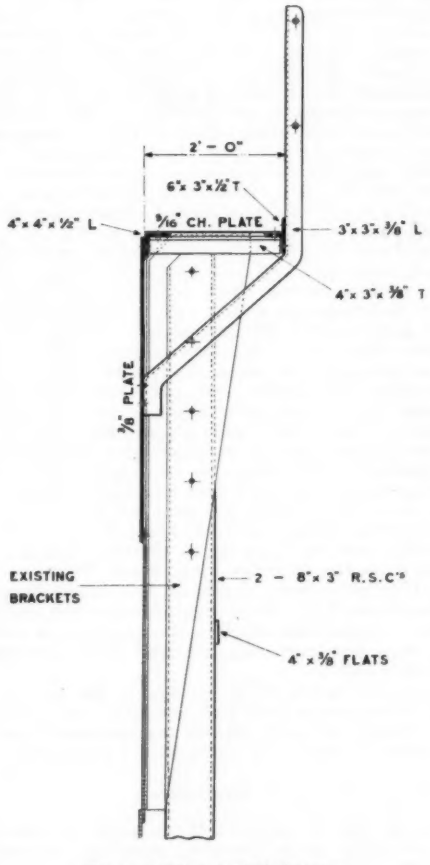


Fig. 4.—Section of Tank Balcony.

The wide stiffened platform with outer T produces a girder construction which meets the requirements.

On the outside of the tank, stiffeners were provided immediately under the tank carriages. These are formed of 2-8 in. by 3 in. R.S.C. suitably braced and secured to the tank by angle clips. The whole of the plates were examined on the exterior and any signs of corrosion examined, cleaned, and filled by electric welding.

Generally, the corrosion inside the tank was slight. One or two plates, on the interior of the tank, had small deeply pitted areas; these were also filled by welding. The tank is half buried in the earth, owing to the nature of its situation; limestone dust being packed against the tank and stanchions on refilling the trench round the gasholder.

Painting.

Internally, the tank was given two coats of a proprietary red lead—lead chromate paint, and the tank bottom a further coat of water bound bitumen emulsion. Externally, the tank and stanchions were given two coats of the same proprietary paint, and, in addition, the three bottom rows of plates and the stanchions to the same level were given two further coats of bitumen, applied hot.

The bitumen used was cut back with a light oil of approximately the same viscosity and specific gravity as paraffin. The coating of bitumen extends to about one foot above ground level.

All the new work of the holder was given one coat of the same proprietary primer before delivery and a further coat as erection proceeded. Two finishing coats were applied externally to the gasholder and the three top rows of tank plates on completion.

Spiral Gasholder Design.

Considerable prominence has been given during recent years to gasholder design, and, in consequence, a critical investigation was made into the available data and its relation to the holder it was proposed to install at Buxton. During this investigation it became evident there were very divergent conclusions in respect of:

(*a*) *Top Curb.*—The extent of cross section over which the compression load may be assumed to be distributed; it appears to be permissible to take in widely varying amounts of crown and side sheeting in order to obtain a section giving a desired factor of safety. The extent to which a stress reduction may be effected by assuming a proportion of the load is taken on the main bars of the trussing. This further introduces the complexity of local bending caused by the main bars—a point which does not appear to have been dealt with.

(*b*) *Cups, Dips, and Bottom Curb of Holder.*—The concentrated loads on the carriages produce local bending at the loading points; the extent to which this may affect the ultimate design of these portions of the holder does not appear to have been investigated.

(*c*) *Top Curb of Tank.*—The investigation further revealed the need for a composite curb, of substantial design, particularly because of the local bending induced at the tank carriages.

These points lead me to suggest that the Gasholder Committee of the Institution should go thoroughly into the question of gasholder design and give the Industry some definite standards.

I trust that the various points raised in this address have been of interest, and in conclusion, allow me again to express my thanks to the members of this Association for the confidence and goodwill shown towards me.

BOOK REVIEW

WATER ENGINEER'S HANDBOOK AND DIRECTORY, 1934.*

So many changes take place during a year that every issue of the Water Engineer's Handbook and Directory constitutes practically a new book, so different is it from the previous one.

The present edition, just published, represents what is claimed to be the most complete and comprehensive directory of British water undertakings ever published, and is thoroughly revised up to the end of 1933, including source of supply, character and treatment of water, developments contemplated, &c. Tabulated statistics in each case of populations served, consumption, storage, and distribution indicate the comparative importance of undertakings, while there is also a complete list of Catchment Boards and Drainage Authorities established under the Land Drainage Act, 1930. A full list is incorporated of engineers, resident, deputy, and assistant engineers, secretaries, and analysts, and the authorities to which they are attached, while an Overseas Section gives details of the main supplies of the Dominions.

A section is devoted to compact and comprehensive data and formulæ constantly required for reference by water officials, and several special articles of interest by eminent authorities on the subject are included. In fact, the Handbook contains everything the water engineer wants, close at hand for easy reference, and the publication should prove quite indispensable to all connected with waterworks practice both at home and abroad.

* Published by *Water and Water Engineering*, 30 and 31, Furnival Street, Holborn, E.C. 4. Price 8s. 6d., by post 9s.

Manchester District Association of Gas Engineers

ANNUAL MEETING

The 64th Annual Meeting of the Manchester District Association of Gas Engineers was held at the Midland Hotel, Manchester, on Friday, March 23. Mr. G. Dixon, B.Eng., A.M.Inst.C.E., President of the Association, presided over the preliminary luncheon proceedings and the earlier portion of the meeting.

Education Scheme.

The President said that a few minutes' time had been allocated in order that Messrs. C. H. Creasey, C.B.E., H.M.I. (Technical Education), and Mr. A. McCulloch (Manchester College of Technology) might put forward an appeal for increased support of the Institution of Gas Engineers' Education Scheme and gas classes.

Mr. C. H. Creasey stated that some time ago there had been some rather pungent criticism of the course of instruction provided at Manchester with reference to the education available for those students who intended to follow the Gas Industry as a career. He thereupon saw Mr. McCulloch, who assured him that the criticism was strictly justified, and immediately the ground for that criticism was removed then there would be an increase in the number of students. It was therefore arranged that Mr. McCulloch should meet the Gas Education Committee and discuss the position with them. There was a fairly wide discussion, and it was ultimately decided to seek an opportunity of talking matters over with the Manchester District Association of Gas Engineers. In London, a survey had been made of the areas from which candidates came who attended examinations of the Gas Education Committee. Although everyone was exceedingly pleased with the success of the Education Scheme as a whole, a Scheme by which the number of candidates had grown from 60 in 1924 to more than 500 in 1933, yet it was realized that the students presenting themselves for examination were coming from the country in patches—namely, that there were some areas from which a large number of students presented themselves while from other areas hardly any students came at all.

He did not know what action the Gas Education Committee would take in regard to the matter, but he did know that everyone felt that it might be possible to get a larger number of students through the efforts and the encouragement of the senior members of the Industry. The circumstances were not alike in each area, or even in each undertaking, but what was felt was that in the case of a progressive industry like the Gas Industry all must move together, and that every generation stood upon the shoulders of those who had gone before. The higher the standard of training could be raised the more effective would be the service the Industry could render.

There was a good deal of difference between the manufacture and supply sides of the Industry. He hoped it would not be regarded as an unfair criticism when he stated that there had been a tendency in the Gas Industry, as a rule, to expect a higher standard of knowledge and training on the part of those engaged in the manufacture than of those engaged in supply, and yet probably the most striking developments of the Gas Industry of recent years had been on the supply side and in the direction of utilization.

There were a few areas in the country where there was every year a very fair proportion of students pursuing a systematic course on the supply side of the Industry, but there were vast stretches of the country where there was nothing at all being done. Provision would be made if there were students, but there were none. It was a striking fact that half the candidates for the gas examinations came from one centre in London; the whole of the rest of the country providing only 50% of the candidates or rather less.

He did not think it was a matter upon which it was possible to offer specific advice at the moment, but it was certainly a matter of interest and of importance to the Gas Industry, and sufficiently so to justify the members of the Association in considering what could be done in order to secure a wider distribution of the standard training which was now being provided in isolated centres throughout the country.

Need for Co-Operation.

Mr. A. McCulloch said that Mr. Creasey had already explained the reason for his attendance at the annual meeting of the Manchester District Association of Gas Engineers, and he desired to thank Mr. Smith and the members of the Education Committee for the very cordial reception he had received at Bolton some time previously. He had visited Bolton in company with Mr. Creasey and one or two other gentlemen, and had ventured to criticize the present state of affairs. Mr. Smith had suggested that he might possibly come forward that day and repeat that criticism, but that he did not feel inclined to do, first because it seemed to him that it would be out of place, and, secondly, because he thought it would be better to summarize the views he expressed at the Bolton meeting in order to indicate what he, personally, had in mind.

The first point he would like to make was that the College of Technology in Manchester was the only Technical Institution in a very wide area—he suggested it was a most important area—and he presumed that the meeting he was addressing was also one of the most important held in the country having regard to the particular purpose it served. As the Manchester College of Technology was the only Technical Institution throughout a very wide area which was professing to give advanced instruction in gas engineering and gas supply, then, if the training was to be effective, it must be given in close co-operation with the Manchester District Association of Gas Engineers and its members individually. How that co-operation could be secured and made effective was a matter for discussion with the Committee of the Association later.

He had been looking through a list of undertakings in the Manchester area and he found that within a radius of 20 miles of Manchester there were 35 municipal and 16 company undertakings, with a rate of gas production varying from 23 to about 7,500 million c.ft. Within 40 miles of Manchester there were 99 undertakings in all, of which 12 undertakings produced more than 1,000 million c.ft. and 21 more than 500 million c.ft. He had acted upon the assumption that every undertaking which was making 100 million c.ft. of gas should have one capable and fully qualified technical assistant on the production side and 2 technical assistants to deal with gas on distribution or supply. Under those conditions, it would mean that within a radius of 20 miles of Manchester 250 men ought to be attending the Manchester College of Technology for a course of gas engineering, and 500 for a course dealing with gas supply, and that from the 40 miles area, which would, of course, include Liverpool and places as far as Stoke-on-Trent, there should be about 450 students for gas and engineering, and about 900 for gas supply. As a matter of fact, some students had been actually received from Liverpool and some from Stoke.

Taking an inclusive all-in survey for the present year—namely, taking group men and men who were taking single subjects—there were only 33 gas engineers and only 15 gas supply men, 7% and 1·5% of the junior personnel.

A Contrast.

He would like to contrast the position of the Gas Industry with that of the chemical industry, because he felt that the capital invested in the former Industry was approximately that of the latter. In regard to the chemical industry the position was decidedly different. The chemical industry was actually sending every year approximately 500 men who were studying chemistry for the purpose of following it up as a career. Probably the position could not be put any plainer than that. Of course, the figures were based upon assumptions, and it was possible to depart from those assumptions quite easily; nevertheless it did appear as though there was a case to put forward as far as the Manchester College of Technology was concerned. A point that he wished to emphasize was that the time was particularly opportune for an approach to be made by the Manchester District Association of Gas Engineers.

The governing body at the College had lately decided to open a Chemical Engineering Department, and there would be facilities afforded for the teaching of such subjects as Fluid Flow, Properties of Materials, Heat Transmission, Design of Plant, &c. The necessary accommodation and equipment were at present somewhat limited, and any assistance in that direction which the Association could render would be gratefully accepted. Nevertheless the courses of lectures mentioned would be available shortly, and it was considered that they would add materially to

the value of the classes available to students interested in industrial problems connected with the Gas Industry.

So much for the junior personnel. He would like, also, to make a plea for students of quite a different and older type. There would be subjects dealt with at the College from time to time in the form of short courses which might interest the members of the Association. Perhaps he might illustrate the point with an example. Some years ago he approached the Manchester Coal Exchange with a view to determining whether there were any points of contact between its members and the College. It was arranged that he should give half-a-dozen lectures upon coal. The first year about 60 men attended the lectures. They were all men of mature years, and among their number were to be found coal factors, coal distributors, coal salesmen, and a few colliery proprietors. Although these men attended the six lectures they were not expected to make notes in the same way that the ordinary student was expected to do so, but duplicated copies of abstracts were supplied to them. At the end of the hour's lecture a man was able to get up and discuss the matters dealt with.

The classes had been continued for the past six years and they had been extremely well attended, and there was at the present time a class of about 40 men. There were, in addition to coal, other subjects which could be dealt with at the College which could not be dealt with in a systematic manner by the Technical Societies—such as, for example, benzole recovery.

He noted that the B.C.G.A. considered it reasonable to spend £90,000, or thereabouts, in 1932, on advertisements. He suggested that some portion of that £90,000 might well be spent in making effective the measures which he had outlined to the meeting.

Mr. W. BUCKLEY, speaking as the representative of the Junior Association, said that the matter was discussed a few weeks ago at the Council Meeting when it was suggested that he might come forward and speak in support of the plea which had been put forward by Mr. Creasey and Mr. McCulloch. He did so most willingly and wholeheartedly. As an illustration of how desirous the authorities at the Manchester College of Technology were to provide suitable lectures for the furtherance of the interests of those connected with the Gas Industry, he could state that during the Session 1932-1933 there was inaugurated a series of lectures on Refractories, a subject which was of paramount importance to the Industry generally. His hearers, however, would be surprised to learn that although a specialist was engaged, who travelled each week from Sheffield in order to give the lectures, only 6 people attended them, with an average attendance of 4. Such a subject should appeal to the Higher Grade men in the Industry.

The PRESIDENT assured the three speakers that the subject with which they had dealt was one which they all had at heart. The Committee of the Association would carefully consider the points which had been raised, and would then pass on recommendations to the Education Committees of the Lancashire and Yorkshire areas. The subject was a very wide one, and he was afraid that sufficient time could not be spared to open up anything like an adequate discussion of it at the annual meeting of the Association. Probably most of those present knew that Mr. Creasey was retiring shortly from his official position, he believed as early as the following week. As far as the Gas Industry in the Lancashire area was concerned they looked upon Mr. Creasey as being the "Education Scheme." He had certainly given them all the benefit of his experience. In the name of all present he expressed the hope that Mr. Creasey would have a long life in his retirement and the best of health.

LACK OF RESPONSE.

Mr. H. E. BLOOR (York), speaking as the representative appointed to go round and inspect the classes in gas engineering, said he had had the privilege of making Mr. Creasey's acquaintance. It was one of the most delightful experiences he had ever had to contact with someone who was a genuine source of inspiration in regard to educational work. Mr. Creasey's enthusiasm was extraordinary, and he, the speaker, gathered the impression that it was being maintained with a very small amount of response from the Industry generally.

The figures which had been put forward by Mr. McCulloch were chastening, and indicated clearly that if the Industry was to maintain its position as being scientifically guided and controlled, immediate steps must be taken still further to train the requisite men of the best type to minister to its needs and to those of the gas-consuming public generally.

Mr. CREASEY was pleased to state that it was only about a week ago that he had received a formal request to permit himself to be nominated on the Gas Education Committee. It was highly probable, unless the members of the Institution in London changed their minds between the present time and early April, that he would retain his connection with the Industry during the next few years. To break that connection would be one of the most serious blows he could experience, and it would take away the pleasure he would feel in his retirement.

ANNUAL REPORT AND STATEMENT OF ACCOUNTS.

The Annual Report and Statement of Accounts was then presented, and was formally received and adopted.

REPORTS OF COMMERCIAL SECTIONS.

Mr. C. S. SHAPLEY (Leeds), in the absence of Mr. E. H. Hudson, presented the Report of the Commercial Section for the Yorkshire Area, which was unanimously approved and adopted.

Mr. H. R. S. WILLIAMS (Altrincham) presented the Report of the Lancashire Commercial Section, which was also unanimously approved and adopted.

THE BENEVOLENT FUND.

The PRESIDENT moved that the sum of 10 guineas be granted to the Benevolent Fund of the Institution of Gas Engineers.

The motion was carried unanimously.

REPRESENTATIVE ON THE COUNCIL OF THE INSTITUTION.

The PRESIDENT moved that Mr. F. G. Shaw, Buxton, be appointed the representative of the District Association on the Council of the Institution of Gas Engineers.

The motion was carried unanimously.

LOCAL REPRESENTATIVES.

The PRESIDENT moved that Messrs. W. Buckley (Manchester) and W. B. McLusky (Halifax) be appointed representatives of the District Association on the Council of the Manchester and District and Yorkshire Junior Gas Associations respectively.

The motion was carried unanimously.

INDUCTION OF THE PRESIDENT-ELECT.

The PRESIDENT remarked that in the President-Elect they had a very experienced and very efficient man. They had all known Mr. Shaw for many years, and the honour of electing him President of the Association was one which was long overdue. Those who had worked with him during the past years knew that he was an exceedingly efficient and enthusiastic Committee man. He made many suggestions, he was always constructive in his policy, and he had been one of the principal contributors to the success of the Association. The honour of being elected President was, therefore, one which Mr. Shaw well deserved. They all wished him a happy and successful year of office.

Mr. F. G. SHAW was then inducted into the Presidential Chair, and invested with the Presidential Badge.

He said that his first Presidential duty was to express on behalf of all the members of the Association their appreciation of the services which Mr. Dixon had rendered as their President during the past year. He had had a very busy year, and he was to be heartily congratulated upon the efficient way in which he had coped with the duties he had to fulfil.

The retiring President was then invested with the Medallion of a Past-President of the Association. He said that the pleasure of presiding over the proceedings of the Association during the past year had been more than sufficient recompense for any trouble which had been taken. At the same time, he felt he must seize the opportunity of gratefully acknowledging the assistance he had received from all those connected with the Association, and particularly so from his old friend, Mr. J. Bridge, the Hon. Secretary, and the Committee. Thanks were due also to those gentlemen who had permitted the members to visit their works, as well as to those who had contributed technical papers and joined in the discussions. The Technical Press were also to be thanked for the kindly way in which they had always recorded the proceedings of the Association. In conclusion, he could only wish his successor a successful year of office and for the Association itself a successful future.

INVITATION TO VISIT BUXTON.

The MAYOR OF BUXTON (Councillor J. H. Smythe, J.P.) said that, although he had not been connected actually with the Gas Industry itself in a strictly commercial sense, yet he had been connected with a branch of industry which might be considered to be its second cousin. When he was in business he had been a Director of a concern which had a plant capable of producing 10,000 gallons of benzole daily. What was now called motor benzole, they called 90's benzole. He had also been interested at one time in the production of a large quantity of sulphate of ammonia, so that he was not really so far removed from being qualified to sit among gas engineers.

He desired to extend to the members of the Association a hearty invitation to visit Buxton for their Annual Con-

ference on July 6, when the Council of that town would be pleased to entertain them at luncheon. Everything possible would be done to make the visit an enjoyable one for the members of the Association, and more particularly so because the Buxton Gas Engineer would be their President.

It was unanimously resolved to accept the invitation of the Mayor of Buxton.

The Presidential Address.

The Presidential Address was then delivered. It will be found on earlier pages of the "Journal" to-day.

Votes of Thanks.

Mr. A. L. Jennings (Spenborough) moved that a hearty vote of thanks be accorded to the new President for his address, which had been mainly devoted to the most important subject which the Gas Industry had to consider at the present day—namely, the supply and sale of gas. The question of the best method of charging for gas was one which was exercising the minds of all those who were in charge of gas undertakings, for there was no method which could be called static and which could apply with equal force to all undertakings throughout the country. A scheme suitable for one district might not be suitable for another.

Most of them would agree with the point mentioned in the address that the efficiency of cookers should not depend upon a too-greatly extended time factor. The great majority of householders who required to use gas cookers would certainly desire to have an appliance which would do the required work in the quickest practicable time, even if the factor of efficiency was a little low in so doing. The same remark applied, also, to all other gas appliances.

Another important point referred to in the Address related to condensation. If condensation resulting from the burning of gas could be reduced in connection with certain appliances such as those used for central heating, then it was desirable to look into the matter and see what could be done actually.

Mr. A. L. Holton (Manchester) seconded the vote of thanks, which was carried unanimously by acclamation.

Mr. G. S. Frith (Runcorn) proposed that a hearty vote of thanks be accorded to the Committee of the Association and to the Hon. Secretary for their services during the past year, much of which work did not appear on the surface.

Mr. H. E. Bloor (York) seconded the vote.

Mr. J. Bridge (Hon. Secretary of the Association), responding, stated that the Committee well deserved the thanks of all concerned for the way they had worked during the past year. The Committee meetings had been well attended, and there had been fruitful discussions—in fact, the discussions had been so helpful that sometimes the President had had difficulty in deciding when they should be closed.

The Auditors had done their work very well also.

He was sorry that an old friend, Mr. William Hill, of Stalybridge, was not present owing to ill-health, but he was glad to be able to report that Mr. Hill was making satisfactory progress. Mr. Hill retired from the post of Auditor this year, after having held the position for 21 years, and during that period he had rendered the Association good and faithful service.

Mr. Bridge stated that it had been a great pleasure to do his work during the past year, as well as in former years, but probably there had been an added pleasure during the past year inasmuch as he had had the privilege and the opportunity of serving his old friend Mr. Dixon. They had been close friends for a number of years.

Principles of Gas Lamp Design

By L. T. Minchin, B.Sc., Gas Light and Coke Company.

[Following is the discussion on the above paper, which, owing to the indisposition of the author, was presented to the London and Southern District Junior Gas Association on March 16 by Mr. K. F. Sawyer, B.Sc., who was associated with Mr. Minchin in much of the experimental work. An extract from the paper was published in last week's "Journal."]

The President (Mr. H. C. Sims, South Metropolitan Gas Company), in opening the discussion, expressed their regret that Mr. Minchin had not been able to be present in person to read his paper, and wished him a speedy recovery from his indisposition. He congratulated Mr. Sawyer on the way he had presented the paper. It was a very specialized paper, and it showed that very patient and accurate work had been done. As they knew, the South Metropolitan Gas Company for the past fourteen or fifteen years had designed all their burners for both domestic and public lighting with fixed air and gas supply. Of course, in a case such as this the quality of the gas had to be kept within very narrow limits, while the density had to be kept fairly constant. Mr. Sims inquired what was the proportion of ceria in the mantles; was there an optimum percentage of ceria which would give the maximum light? Lamp makers in general were collaborating fairly closely with gas undertakings, which was not only improving the efficiency of the lamp, but also its artistic appearance. One manufacturer he knew of had just equipped himself with a most elaborate and expensive photometer room.

Mr. Beuttell (Vice-President of the Illuminating Engineering Society) extended the greetings of his Society to the London and Southern District Junior Gas Association, saying that he considered it a privilege to be enabled to listen to such an extremely interesting paper. As a non-technical "gas man" he could not but admire the tremendous amount of scientific and technical work being put into the subject of gas lighting, and one could not but think that it would lead to important results. The whole subject appeared to him in this way—that the possibilities of gas lighting ought to be very much greater than the possibilities of other forms of lighting for the reason that it was at present so inefficient. That might sound paradoxical; but what he meant was that so much more thermal power was available if they could only harness it. It seemed to him that it was a question of temperature and the discovering of bodies which were more refractory than the materials they were now using for the provision of incandescence. He was interested to learn that thoria and ceria, according to the curves, gave a distribution almost exactly proportional to that of a black body. That being so, on the attainment of a certain temperature, the ceria started to volatilize or disappear, which seemed to him to mean that they must find a material capable of being raised to a higher temperature without the distribution curve "passing too far over into the blue."

Efficiency of Illumination.

Mr. C. A. Masterman (Gas Light and Coke Company), in a written contribution, said how sorry he was that he could not be present to take part in the discussion on Mr. Minchin's paper, which he had read with great interest. He knew the work which Mr. Minchin had put into the preparation of this paper, and considered it most unfortunate that owing to illness the author was unable to be with them himself to deliver it. They would have appreciated the care which was required in lamp design to obtain the highest efficiency, and they would have followed with interest the analysis of the various factors whereby still higher efficiencies from gas mantles might be obtained. The problem of obtaining a considerable increase in lighting efficiency was not an easy one, and it was not to be anticipated that by laboratory work great increases in efficiency were likely to be obtained. The user of gas lighting was not directly concerned with lighting efficiency, of which he was probably unconscious, but rather with efficiency of illumination. To achieve this required choice of the most suitable light source, bearing in mind light output, light distribution, and the space-height ratio of the lamps after erection. The provision by the laboratory or by the designer of satisfactory lamps represented only the first step in the creation of a satisfactory lighting installation, the final and most important steps being those taken by the individual who planned the installation itself. It was possible that the loss of an appreciable part of the gas lighting had been due to negligence on this score, combined with a certain absence of enthusiasm for which there was no adequate reason. There were certain "stunt" forms of lighting for which gas was unsuitable; but, outside these limitations, gas lighting was capable of providing perfectly satisfactory illumination having certain definite advantages over competitive forms, not only on the grounds of cost but also wavelength of light in relation to eyestrain, wavelength of light in relation to penetration through fog, light distribution and intrinsic brilliancy in the absence of reflectors or refractors, and reliability. It would be familiar to many of them that the heating component of gas lighting was more often than not a real advantage, as mentioned by

Mr. Minchin in his paper. The lighting load of the Gas Industry was certainly not less than 10% of the total, so that its retention was a matter of considerable importance to the Industry as well as to the community which it served so well.

Mr. J. R. Hepple (Lighting Superintendent to the Newcastle-upon-Tyne and Gateshead Gas Company) said that, as a visitor, he would like to congratulate Mr. Minchin and those who had been associated with him in the preparation of the paper. Each of the various sections into which the paper was divided presented subject matter for careful consideration. It was interesting to note that a higher efficiency in lumens per c.ft. was obtained when using " B " (long bijou) mantles than was the case when using " C " (No. 2 cluster) mantles. This meant, in effect, that a lamp fitted with 7 " B " mantles consuming 14 c.ft. of gas per hour had a total output of 3,290 lumens, while a lamp fitted with 6 " C " mantles consuming 14½ c.ft. of gas per hour had a total output of 2,900 lumens. Another important fact to note was the marked effect that nozzle shape and the size of hole in a lamp globe had upon the efficiency. As a superheater carrying 7 " B " mantles would be larger than one carrying 6 " C " mantles, could Mr. Sawyer say whether or not the heat radiated from the superheater would increase the risk of breakage of refractors and globes?

Value of Research Work.

Mr. W. J. G. Davey (W. Parkinson & Co.) testified to the valuable assistance rendered to the lamp manufacturers by the research work of the Gas Light and Coke Company. Much as the manufacturers would like to carry on research work of this character, their technical staff found that they had not the time to devote to it as a result of their routine work; so they were bound to rely upon such research stations as Watson House. Without such co-operation they would be very much in the " dark ages," such as when they thought the hole in the bottom of the globe had to be large enough to allow of the passage of the mantle. It was not so long ago that it was thought that proper aeration could not be obtained if there were more than four burners on a fitting. Up to ten lights, said Mr. Davey, there ought to be higher efficiency per mantle the more mantles there were in the cluster. Above that number the screening effect prevented any increased efficiency per mantle.

Mr. C. I. Winstone (Gas Light and Coke Company) said that those who knew Mr. Minchin would realize the work that had gone to make this paper must have been very extensive. At the same time they much appreciated Mr. Sawyer's reading of the paper. The heart of the lamp was the burner, because there were certainly more barriers to increased efficiency from the burner than from any adjustment of the case round the burner to accommodate the light. Mr. Minchin had said in the paper that it was a sound general principle in the design of gas appliances that the volume of excess air passing through the appliance must be maintained sufficient to allow an overload without smothering, while a little later he had said that the effect of increase in temperature of secondary air on lighting efficiency was very small—not more than 3% for an increase of 200° to 400° F. If the effect was not more than 3%, it looked as though they need not worry about warming the incoming air; but it was a surprise to him to know that they need not worry about warming the secondary air, because it had always seemed to him that the warming of the secondary air had a considerable effect upon the performance of the lamp. Could Mr. Sawyer explain this?

Laboratory Limits in Practice.

He also mentioned that there was a minimum of secondary air required for efficiency; that might be all very well for the laboratory, but one could not work to these limits in the street. If they worked a 10-light superheated lamp very nearly to these limits, they would never obtain satisfaction on a windy night, whereas a 10-light superheated cluster in a 15-light casing would give an excess of secondary air, so that the combustion of air in the lamp would prevent oscillation in the burner. They could not work to limits in street practice with exactly the right amount of excess air to get perfect combustion, for the reason that if they did a great many lamps working within these limits would fire back on windy nights. Therefore, so far as street lighting was concerned, it was better to have ample excess air. They had found that if a medium sized superheated burner was put in a large casing the cost of maintenance could be reduced by something like 30%. But if a 5-light burner was put in a 5-light casing the maintenance cost in proportion went up.

Mr. Winstone said that he could never understand why the top baffle of the lamp could not be adjustable. Of two lamps made exactly alike—one at the corner of a street and the other further on—the one would work well, while the other would give trouble. If, however, the top baffle were adjustable one could control the regulation of the lamp by slowing up or increasing the ventilation. There must be an advantage in being able to close the baffle in certain circumstances to increase the burning efficiency. Mr. Minchin had referred in the paper to dark spaces in lamps. In this connection, upright street lamps were often fitted with clock controllers. These should be painted white, while the superheater should be metallized—painting the latter aluminium was useless. The old types of lamp were disappearing, which was all to the good, for, if the total of the ribs in these lamps was measured up it would be 7½ in. In conclusion, Mr. Winstone said that the ventilation of the upright lamp was much simpler than that of the globe lamp.

Efficiency of Gas Lighting.

Mr. F. C. Smith (Gas Light and Coke Company) remarked that he had had the opportunity of watching the progress of Mr. Minchin's work and of making suggestions from time to time. There was no one more disappointed than Mr. Minchin in not being able to be present. Mr. Beuttell, said Mr. Smith, had put his finger right on the spot when he referred to the very low efficiency of 0·2% of the energy supplied being actually distributed as light energy. All sources of artificial light had a relatively low efficiency; the most efficient was probably the discharge tube lamp. The best efficiency they knew of from low-pressure superheated lamps was something of the order of 235 lumens per c.ft. The efficiency of the high-pressure lamp was of the order of 350 lumens per c.ft. Why was the high-pressure more efficient? The reason, they believed, was that all the air was taken as primary air with the result that there was a higher flame temperature. They must see if these conditions could be applied to low-pressure lamps; if so, they would get an immediate step up from 235 to 350 lumens per c.ft. Months and months of work had been done in trying to produce high-pressure efficiency with low-pressure gas, and the work had not been altogether without success; considerable progress had been made, though the work had not yet reached finality. Mr. Minchin had next tried to discover various factors which influenced the light output and analyze them; but so many variables were present that it was difficult to separate one at a time.

Mr. Smith suggested that all those in the Gas Industry who were interested and had the facilities should try to pursue this work to a conclusion. There was now a spirit of optimism abroad in regard to gas lighting. Too many gas undertakings had been prepared to let this load slide. When one looked at the appearance of some gas lamps to-day, it seemed that they were much the same as they were twenty years ago. But, on the other hand, a certain amount of work had been done; the British Standards Institution had arranged meetings in Manchester and Birmingham, and by the co-operation of some of the makers, lamps were now being produced of much better appearance, which he hoped would be exhibited at the forthcoming Ideal Home Exhibition. If the appearance was good and they could produce a light at a cost in certain cases as low as or lower than their competitors, the only thing that remained to prevent gas getting in was prejudice. They must design burners and lamps pleasing in appearance, and the public would respond to their efforts. Mr. Smith referred to the magnificent example of gas stage lighting which the South Metropolitan Gas Company had installed at their Co-Partnership Institute at East Greenwich. In conclusion, he asked Mr. Sawyer to indicate something of the work which had been done to reduce the noise which was an objectionable feature in the lighting of the interior of buildings.

Decreasing Mantle Size.

Mr. L. H. Pinkess (Gas Light and Coke Company) said that very little accurate scientific data had been available on lamp design, and it must now be in the interests of gas lighting that such work could be undertaken. The results obtained had shown that every effort was well worth while. Bijou mantles were generally more efficient than the larger sizes; what, therefore, would be the effect of utilizing still smaller mantles. With smaller mantles the ratio of surface to volume increased, and one would therefore expect the temperature to drop by reason of the radiation being greater. In that connection it might be useful to alter the composition of the mantle mixture to allow for extra radiation. There could be considerable variation of flame temperature. Would it be possible, by altering the shape of the mantle in relation to known properties of the flame, to obtain higher efficiency?

Mr. H. J. Risby (South Metropolitan Gas Company) inquired if anything had been done to depart from the orthodox design of gas mantle or to get away entirely from the ordinary mantle. Another point was in regard to the fact that they were losing a great deal of lighting as a result of people desiring electricity for working their wireless sets. Could not some form of thermocouple be fitted in conjunction with a lighting burner to provide energy for operating wireless sets?

Mr. J. M. Webber (Croydon) said that while they were going ahead in increasing the efficiency of gas lighting, could not something be done to remove the unsightly nobs and screws appertaining to gas lighting fittings, and also provide an adjuster which did not become " red hot." The makers could do a great deal by providing fittings which looked modern and comparable with the clean, attractive fittings provided by the electrical industry.

Mr. M. Walker (Lea Bridge) could not help recalling to mind their recent visit to the British Industries Fair where he had been particularly struck by the very modern and artistic forms of lamps for interior domestic lighting. In view of the remarks of Mr. Smith and Mr. Webber, and remembering that they had representatives of the lamp manufacturers with them, he would like to know if the Association could have a word from them as to the possibilities of putting these fittings on the market rather more cheaply. The trouble was that these beautiful lamps were outside the scope of the average purse and could not compete with electrical fittings. Did the public know sufficient about modern gas lamps. The efficiency of the light was largely dependent upon the flame temperature, and

he had been a little surprised that no mention was made of the composition of the gas which was burnt in the lamp. He thought it was recognized that it was advantageous to have a fairly high proportion of carbon monoxide, and he would like to know if any experiments had been made as to the advantages of varying the proportion of carbon monoxide in the gaseous mixture.

Reply to the Discussion.

Mr. K. F. Sawyer, replying to the discussion, said, in reply to Mr. Sims, that he agreed that a fixed gas and air adjustment was desirable in domestic appliances; but it was very inconvenient in experimental work, since other effects might then be masked by changes in aeration. He also regarded it as a very encouraging sign that some makers were improving their photometric apparatus. Mr. Beuttell and Mr. Smith raised the question of the low luminous efficiency of the gas mantle. As mentioned in the footnote, however, this figure should be related to a maximum efficiency of 13% rather than 100%, which could only be obtained with a monochromatic source. He was very interested in Mr. Hepple's experiences with the new refracting glassware; but they were at present unable to state what would be the effect on globe maintenance of using bijou mantles. They had found that the 5-light cluster was not very suitable for use with these refractors owing to its lack of symmetry.

With regard to Mr. Davies' observations on the efficiency of large cluster lamps, they had not observed any substantial difference between 5-light and 10-light lamps, but they had little experimental data on larger lamps. Mr. Winstone's remarks about wind resistance and maintenance were very interesting. Their results indicated that the volume of secondary air was not of prime importance, although at the moment they knew of no real explanation. He did not think that the cause of firing back could be traced to too little secondary air. The idea of a variable flue baffle was novel; but it would probably not be necessary in the majority of cases. It would seem that in view of their low efficiency and undesirable appearance the ribbed lanterns might be regarded as out of date.

Mr. Smith had referred to the question of noise from gridend burners. This, as shown in the A.G.A. publication "Combustion," could be reduced by the use of silencing fins in the nozzle, and their experiments had confirmed this. The suggestion put forward by Mr. Pinkess implied that the volume of the mantle was proportional to the optimum gas rate. This had not been proved, but the theory was roughly borne out by the higher efficiency of bijou mantles. The question of whether the mantle was in the hottest part of the flame could not readily be answered, since the shape of the flame itself depended largely upon the mantle. The comparison of the direction of the products from the Lucas lamp with that of an ordinary burner might, as he suggested, throw some light on the failure of this type; but it must be pointed out that in the high-pressure lamp the pressure in the mantle must be considerably higher than that outside.

He agreed with Mr. Webber that many existing gas fittings were unsightly and somewhat inconvenient to adjust. Designs were being prepared at Watson House to meet this objection. These finer adjustments could not always be made when abnormal weather conditions had to be met. But in order to take advantage of all the results contained in this paper it was really necessary to design an entirely new lamp which would be independent of weather conditions.

Vote of Thanks.

On the proposition of Mr. F. C. Smith (Senior Vice-President), seconded by Mr. J. M. Webber (Junior Vice-President), a hearty vote of thanks was accorded to Mr. Minchin for his paper and to Mr. Sawyer for the way he had presented it.

The European Gas Company, Ltd.

The Annual General Meeting of the European Gas Company, Ltd., was held in the Middlesex Room, Great Eastern Hotel, Bishopsgate, London, on Tuesday, March 20th, 1934. Mr. Frank H. Jones, M.Inst.C.E., Chairman of Directors, occupied the chair.

The Secretary (Mr. T. H. Martin), having read the notice convening the meeting and the Auditors' certificate, which was attached to the balance-sheet, it was agreed, on the motion of the Chairman, to take the Report of the Directors and the Statement of Accounts as read.

The Chairman then said: I now have to propose:

> That the Report of the Directors and the Accounts of the Company for the year ended December 31st, 1933, be received and adopted.

The stockholders will have gathered from the Report that the year 1933 was not an unsatisfactory one for us; and if we succeeded in increasing the quantity of gas sold to the extent of nearly 2%, this was due rather to the efforts of our Commercial Departments and to the development of our propaganda work, than to any improvement in industrial conditions in France.

Stockholders will have learned from the Press that conditions in France have not been too easy; for the first time there has been a considerable amount of unemployment, and most industries are in a depressed state. This hits us in two ways, for less gas is being taken for industrial purposes, and, employment being slack, the workers are not able to use so much gas in their homes.

For many years past we have been building up a commercial organization, and while we are far from having reached a point where we are satisfied that that organization is adequate, we think that the experience of the past year furnishes ample justification of our efforts in this direction, and of the steps which we have taken, by introducing attractive tariffs for special purposes, to encourage the greater use of gas by both industrial and domestic consumers.

As an instance of the efforts which have been made, it may be interesting to mention that, during the course of the year 1933, the cash sales of apparatus at our showrooms showed an increase at the rate of 16%, while credit and instalment sales rose by 48%, giving an average for all sales of 36%, as compared with the previous year.

It may also be interesting to mention that since we started an energetic campaign at Nantes in the year 1931 in favour of central heating by gas, we have installed, in Nantes alone, 119 gas fired central heating installations.

While, therefore, the outlook in France is not too promising if we consider only the general prospects of trade and industry, we are not unhopeful as regards gas consumption, because the increasing sale of gas consuming apparatus must obviously lead to the use of additional quantities of gas.

It may be added in passing that the figures of sales of gas apparatus for the current year are still well on the up-grade.

As indicated in the Report, we sold more gas in 1933 than ever before in our history.

The Report also makes reference to the question of unaccounted-for gas, which has given the Board cause for much preoccupation ever since the war. A vast amount of work has been carried out since 1920 on the system of mains, and while it is early yet to prophesy, and it is extremely probable that we shall from time to time have setbacks, as, for instance, during the cold spell before Christmas, the year 1933 brings the first clear indication that the work done is beginning to have its effect. From 1914 up to 1927 the unaccounted-for gas showed a regular increase; there was considerable improvement in 1928, but 1929 showed a relapse; since 1930 there has been a steady improvement each year.

The Board attach the greatest importance to solving this problem, and no relaxation of effort will be permitted. We must ensure that the advantage already gained may be held, and a further improvement made, until at all the works the figure of unaccounted-for gas is brought down to a reasonable amount.

In all the circumstances the Board felt justified in recommending the maintenance of the increased dividend at the rate of 6% for the year, free of tax, which was paid for the first time in respect of the year 1932.

At present we are paying an interim dividend of 2½%, and a final dividend of 3½%, and, as mentioned a year ago, it is the intention of the Board eventually to equalize as far as possible the amounts distributed by paying the same rate for both interim and final dividend. It was stated, however, that it would be unsafe to make this alteration until the exchange position is more settled, and conditions have hardly been such during the past year as to warrant the Board in making this alteration.

Stockholders were warned last year that when the alteration is made, it must not be assumed that an increase of the interim dividend for this purpose is necessarily to be followed by an increase of final dividend. It may be well to repeat this warning on the present occasion.

Continuing their policy of providing better showroom premises and more suitable accommodation for the Commercial Departments which are responsible for the sale and development of the use of gas, the Board have acquired a site, as stated in the Report, for a new showroom and offices in a central position at Havre, our second biggest town; meanwhile, as a temporary measure, the present showroom, which is not well situated, and the offices of the Commercial Department, have been modified and made more attractive to the public who have occasion to call there. Improved business has already resulted.

As mentioned in the Report, a concession has been obtained for the supply of gas to Ambleteuse, near Boulogne; this is a growing summer resort, but it is a considerable distance from our nearest main, and the probable consumption would hardly justify, for the present, the expense of connecting it up. We are therefore doing something which is very uncommon, putting up a small holder at Ambleteuse and laying mains in the streets, and gas under compression will be supplied to the holder in cylinders which will be conveyed by lorry from Boulogne to Ambleteuse. This is a development of the distribution of gas which may be capable of further extension.

Finally, the Report refers to our new Works at Roche Maurice,

Nantes. The Board consider that the progress made during 1933 was very satisfactory, and since the beginning of the current year such further progress has been made that it is possible to say with practical certainty that gas-making operations will commence within a few weeks.

A stock of coal has already been accumulated there, and unless something quite unforeseen occurs, no more coal will be sent to the old works.

It will, of course, be necessary to keep the old works in being for some months, at any rate until the new works is running satisfactorily, and until we are satisfied that everything is in order, and that we can safely entrust the gas supply of the town of Nantes to the new works at Roche Maurice.

It is perhaps only fair on this occasion to say that the entire work of planning, designing, controlling and supervising the erection of the new works has been carried out by the Company's own staff—we have had no outside help—and that special credit is due to the Company's Liaison Engineer in France, M. Bolzinger, who was attached to the London Office and specially entrusted with this work.

M. Bolzinger will shortly relinquish the post of Liaison Engineer to take up the position of Manager of the Nantes Station in succession to M. Huon—who has held many positions in the Company's works and has been Manager of the Nantes Works for some years—who retires at the end of this year after forty years of service.

Turning now to the Accounts, there are only one or two items which call for comment.

It will be observed that the figure for rates and taxes in London and France, including provision for British income-tax and French taxation, is substantially lower than it was a year ago. This is due to the fact, as explained at the last general meeting, that provision was made in the 1932 Accounts for probable claims, which have since matured, in respect of arrears of French taxation, and the 1932 figure was therefore unduly swollen.

This year the Revenue Account shows a considerably larger allocation under the heading for "Provision for Renewals"—£52,000, against £12,000. This is entirely due to the expenditure on account of the new works at Nantes, which, in so far as they represent, up to equal capacity, merely a replacement of the old works, are and have been treated as a revenue charge. This year, as on previous occasions, the sums properly chargeable against revenue in respect of Roche Maurice have been carried against the Contingencies and Renewals Fund, but as this was inadequate to meet the whole charge a special allocation was made to it from profits, and, as will be seen from the balance-sheet, the Renewals and Contingencies Fund, which last year stood at £91,000, now shows a balance of only £27,000.

The Board fully realize that the figure of £27,000 is insufficient to meet the purposes of the fund, which is intended to provide for renewals and replacements necessary at comparatively long intervals, as distinct from ordinary repairs and upkeep.

The complete replacement of an entire works—and that the largest owned by the Company—is, however, of quite an exceptional character, and it is not surprising that the Contingencies and Renewals Fund, and, indeed, the Company's resources generally, should be temporarily strained during the period of construction.

The fund was constituted in 1930 by the transfer of the free balance of the Insurance and Guarantee Fund and certain reserves which had from time to time been provided in view of the construction of the new works at Nantes, and receives a fixed allocation every year; it is evident that it has not been long enough in existence to allow of the growth of a sufficient reserve to stand such an abnormal drain upon it as has recently occurred.

It will therefore be necessary, as soon as expenditure on Roche Maurice has ceased, to start building up the Renewals and Contingencies Fund again in order that it may be available for the purpose for which it was constituted.

Probably the only other item in the Accounts which calls for special comment is that of the Sterling and Franc Bank Loans, which have gone up by, roughly, £100,000 in the year. This increase is, of course, due to the expenditure on the new works at Roche Maurice, which will very shortly be coming to an end. Although considerable expenditure will naturally be necessary at other Stations to meet the growth of the business, nothing on the scale of that involved by the construction of the new works at Nantes is contemplated or likely in the near future.

You will see that the Directors have elected Mr. F. Eliot Williams, O.B.E., who has been General Manager and Secretary since 1919, to a seat on the Board and have appointed him Managing Director, and you will be asked in the course of this meeting to confirm his election. Mr. Williams's father, Mr. William Williams, became connected with this Company in 1878. He was successively Secretary, Secretary and General Manager, and Managing Director, until his death in 1918. Mr. Eliot Williams, who entered the Company's service in 1919, spent practically the whole of his working life from 1897 until that year in the service of the Imperial Continental Gas Association. He served the country during the war, where his special knowledge of languages came into valuable use, and he was appointed General Manager and Secretary of this Company in 1919. We have felt on the Board that it was very desirable that Mr. Williams, when in France, in approaching the Directors of other concerns, should have the full status and position which being a Director can give him, and the Board are unanimous in asking you to accept Mr. Williams as a Director. I am not going to stand here and flatter Mr. Williams, but you know what he has done for the Company, you have seen him at these meetings, and his work has been evident in our successive Reports and Balance-Sheets. It would be very difficult to replace him.

We have also appointed another very old servant of the Company to the position of Secretary, while retaining that of Assistant General Manager—namely, Mr. T. H. Martin. Mr. Martin entered the Company's service in 1891, so that he has served us for 42 years, during the last ten of which he has been Assistant General Manager. We know perfectly well that he will carry out his duties in the way the Board desire.

I must also refer to the resignation on pension, due to the effluxion of time, of Mr. P. J. Heather, our Chief Accountant. His place has been taken by Mr. Walker, who has been in the Company's service for a good many years, and is well tried and efficient. Mr. Heather has left the Company, with the good wishes of us all, having served it very faithfully for 48 years.

I have already proposed the resolution, and I will ask the Deputy-Chairman to second it.

Mr. A. M. PADDON (Deputy-Chairman) seconded the resolution.

The CHAIRMAN, having replied to points raised by stockholders, *the resolution was then put and carried unanimously.*

DECLARATION OF DIVIDEND.

The CHAIRMAN then proposed:

> That the interim dividend at the rate of 2½% paid on September 30th last be confirmed; that a final dividend of 3½% be now declared, such final dividend to be paid on March 31st, the whole out of interest and profits, and free of income-tax.

Mr. A. M. PADDON seconded.

The motion was carried unanimously.

RE-ELECTION OF DIRECTORS.

The CHAIRMAN next proposed:

> That the retiring Directors, Mr. A. M. Paddon and Mr. S. H. Le Roy-Lewis, who, being eligible for re-election, offer themselves accordingly, be and are hereby re-elected.

Mr. W. G. BRADSHAW said that he had great pleasure and confidence in seconding the resolution.

The resolution was carried unanimously.

The CHAIRMAN next moved:

> That the election as Director of Mr. F. Eliot Williams, O.B.E., be and is hereby confirmed.

Mr. PADDON seconded.

This also was carried unanimously.

RE-ELECTION OF AUDITORS.

Mr. G. O. THOMAS next proposed:

That the retiring Auditors, Mr. B. Dennett Holroyd and Mr. D. M. Touche, be and are hereby re-elected.

Mr. BISGOOD seconded.

This was carried unanimously.

VOTE OF THANKS TO STAFF.

The CHAIRMAN proposed:

> That the best thanks of this meeting be given to the staff of this Company in London and abroad for their services during the past year.

He said that the staff at the London office was most extraordinarily efficient, and the Company had also to congratulate itself upon a staff abroad which was very loyal and hard-working.

Mr. ROY-LEWIS seconded the vote of thanks, saying that as one who had visited recently practically all the works of the Company in France, he could vouch for the excellence of the staff out there. Every single member of the staff was devoted to the interests of the Company.

The motion was carried unanimously.

Mr. ELIOT WILLIAMS thanked those present for the vote of thanks, and said that the Chairman had not exaggerated the facts of the situation when he commented upon the loyalty and devotion of the French staff.

The proceedings closed with a vote of thanks, moved and seconded from the body of the meeting, to the Board of Directors and to Mr. F. H. Jones for his conduct in the chair.

Wellington (N.Z.). Gas Company.

During the past year 710 services were connected and 1,923 cookers installed by the Wellington (New Zealand) Gas Company). After payment of the interim dividend of 4% on the ordinary shares, the year's dividend on the preference shares, providing for depreciation of plant, buildings, machinery, &c., also debenture redemption fund and insurance fund, the balance to the credit of profit and loss amounts to £25,559. It is recommend that this sum should be appropriated as follows: To payment of a further dividend of 4% (making 8% for the year), and carry forward the balance of £14,407.

British Gas Light Company, Ltd.

The Two Hundred and Third Ordinary General Meeting of the British Gas Light Company, Ltd., was held on Wednesday, March 21, at the Chief Office of the Company, 2, The Abbey Garden, Westminster, S.W. 1—Mr. HENRY WOODALL, M.Inst.C.E. (Chairman and Managing Director), presiding.

The SECRETARY (Mr. A. J. Mumford) read the notice convening the Meeting, together with the Reports of the Auditors. The Directors' Report and Statement of Accounts for the year ended Dec. 31, 1933, were taken as read.

THE CHAIRMAN'S ADDRESS.

The CHAIRMAN said: It is my sad duty to report the death of our old friend Mr. John Young. Mr. Young was our Senior Engineer and retired in 1919 after thirty-seven years in the Company's service. He earned the respect and affection of all with whom he came in contact.

Last year was not a good "gas year." We had a long dry summer and very little cold weather, and it is therefore not surprising that we show a small decrease in our total sale of gas of just over 1¾%. It is interesting to note, however, that in fourteen of our Undertakings we are able to record increases in our sales.

We have never sold so many gas appliances as we did last year, and should 1934 be a normal year, we are bound to feel the effect of these increased sales. As you know, we suffer from severe electrical competition, especially at our two largest stations, Hull and Norwich, and we are fully alive to the necessity of ever-increasing activity in our Sales Department. We have increased our sales staff (male and female); in addition we are continually holding gas exhibitions and giving cookery demonstrations. In connection with these demonstrations and exhibitions I should like to pay tribute to the ready collaboration and assistance we receive from the appliance makers. All these activities cost money, but we feel that it is money well spent.

The reduction in the sales of gas at Hull is in part due to the intensive competition from the Corporation Electricity Department, but continued financial stringency is also an important factor. Another contributory cause is the five years' Slum Clearance Scheme, whereby some 1,500 working-class families are being moved each year from the old tenements in the city to Corporation Housing Estates on the outskirts of Hull. Here they are faced with higher rents and heavier travelling expenses to their work, with the result that there is less money available for food and other purposes. In addition, we lose their lighting, as they are compelled to have electric light on the Housing Estates. The Scheme though obviously for the good of the city, is not necessarily so for the Gas Company, at all events in its initial stages.

SUBSTANTIAL RESERVES.

As you will see from the report we have been able to accumulate a substantial reserve fund at Hull, and this year we have had to call upon it to the extent of just over £14,000. We still have in the fund nearly £62,000, and I hope we shall soon be adding to it again. In any case it should be ample to enable us to pay our full Parliamentary Interest until the time comes when there is an improvement in trade, which we have reason to hope is on the way. I might call your attention to the fact that in 1919 there was no reserve fund at Hull at all. During the year we spent the large sum of £90,000 in maintenance of works and plant.

At Norwich the reserve fund, which was also non-existent in 1919, has been increased this year by over £5,000, and it now stands, as you will see by the accounts, at over £18,000. Here again we have spent large sums on repairs and maintenance during the year amounting in all to £47,000. This expenditure enables us to keep everything on our works and district in good order.

At Trowbridge the profits have exceeded the Parliamentary Interest by £1,000. At this Station we are spending a somewhat large amount on extensions, as we are proposing to shut down the works at Bradford-on-Avon and make all the gas required for that district at Trowbridge. The expenditure will no doubt be remunerative.

Two years ago you will, perhaps, remember I referred to the purchase of the Flint Undertaking and the proposal to link this up with the Holywell Station. The work is well in hand and the high-pressure main connecting the two works has been completed. In due course the carbonizing plant at Flint will be shut down and the works there used only as a distribution centre.

We have been able to purchase an important site in the principal square in Flint for the erection of showroom and offices. Here, again, although the expenditure is somewhat large, I am confident the result will be satisfactory.

SWANAGE UNDERTAKING SOLD.

The Subsidiary Companies have done well, and during the year we have acquired two small Undertakings, one in Norfolk and another in Sussex. It is unusual for us to sell one of our works, but on this occasion we have to report that we have disposed of our interest in the Swanage Gas and Electricity Company. The position there was that the electric plant was becoming insufficient to cope with the maximum demand. As you are doubtless aware, the policy of the Electricity Commissioners does not allow of the continuance of small generating units; in consequence it would have been necessary to obtain a bulk supply of electricity from the large neighbouring undertaking of the Bournemouth and Poole Electricity Company. Very considerable expenditure in connection with mains, re-organization, and other matters was involved, and it was felt that the proper course was for the Bournemouth Company to take over control of Swanage. Acceptable terms were arranged, and the transaction showed a satisfactory profit to the Company which, as you will have read in the report, has been added to the reserve of profits on realization of assets and sales of land.

I have taken out a few figures with regard to reserves and undistributed profits, as they stood in 1919, and as they stand to-day. They are as follows:

—	30th June, 1919.	31st Dec., 1933.
	£	£
Carry forward	46,895	88,019
Parent Company—		
Reserve re sale of assets, &c.	69,798	121,461
General reserve fund	33,695	160,000
Hull reserve fund	*Nil*	61,843
Norwich reserve fund	*Nil*	18,780
	£150,388	£450,103

Half of this £450,000 is invested in Government and other securities. These figures illustrate the strong and increased financial stability of our Undertaking.

To sum up the financial position: we have added £11,283 to the total of reserve and pension funds; we can pay our full dividend of 7½% and increase our carry-forward, which now stands at the substantial figure of £88,019, by £159.

SUBSIDIARY COMPANIES.

There is one small point I would like to refer to, as it might occur again. You will notice that we say, with regard to the Subsidiary Companies, that "no losses have been incurred;" this in the Directors' view correctly states the position, but it has given rise to some slight difference of opinion with our Auditors. The point arises in connection with a very small Undertaking which had been badly maintained while a large carry-forward had been accumulated. Had this carry-forward been spent on maintenance it would not have been necessary for us to carry out extensive repairs, and we have therefore treated the carry-forward as a deferred renewal fund. Our Auditors, while they concede there was a profit on actual trading, hold the view that repairs and renewals ought to be charged against current account, thereby in this particular case showing a loss. Had this little Undertaking been carried on in the past as it will be in the future, this point would never have arisen.

With regard to the future we realize we shall have to meet increased competition. We have, however, excellent products to supply which are recognized as essentials; never has the Gas Industry been better organized; our research work is in the hands of first-class people whose services we have only recently felt to be necessary to the proper conduct of our business, and this applies to all departments. Everyone now realizes the great importance of our coal industry, and the Gas Industry is probably doing more than any other to extend the proper use of coal.

In conclusion, I have to thank our officials and workpeople for their most excellent and loyal service. In these last few difficult years the results we have been able to put before you could only be obtained by the combined effort of all concerned.

I have now much pleasure in proposing the adoption of the Report and Accounts.

The DEPUTY-CHAIRMAN (Mr. Harold G. Palmer) formally seconded, and, no questions being raised, the resolution was put to the meeting and carried unanimously.

DIVIDENDS.

The CHAIRMAN then moved that the payment by the Directors of the dividends at the rate of 7% per annum, less income-tax, on the cumulative preference stock and 5½% per annum, less income-tax, on the "B" redeemable cumulative preference stock, as mentioned in their Report of March 12, 1934, be confirmed.

This was seconded by the DEPUTY-CHAIRMAN and carried.

The CHAIRMAN next moved that the payment by the Directors of the interim dividend at the rate of 3½%, less income-tax, on the ordinary stock, as mentioned in their Report of March 12, 1934, be confirmed, and that a final dividend on the ordinary stock at the rate of 4%, less income-tax, making 7½% for the year, less income-tax, be now declared, the same to be payable on April 5 next; and that the dividend warrants be sent by post to the last known address of each proprietor, unless instructions have been received to the contrary.

This was also seconded by the DEPUTY-CHAIRMAN and carried unanimously.

RE-ELECTION OF DIRECTORS.

The CHAIRMAN moved the re-election of Viscount Mersey, being one of the Directors retiring by rotation, remarking that

they were very pleased to see him with them, as he had some difficulty in getting away from a Parliamentary Committee of which he was Chairman.

This was seconded by the DEPUTY-CHAIRMAN and carried.

The CHAIRMAN also moved the re-election of Mr. Edward Corbet Woodall, the other Director retiring by rotation. He was their youngest Director and a very active one, and was always ready and willing to visit their various stations to look after the interests of the Company.

This was also seconded by the DEPUTY-CHAIRMAN and unanimously agreed to.

RE-ELECTION OF AUDITORS.

The Auditors of the Company, Mr. E. Knowles Corrie and Mr. William Cash, Jnr., were unanimously reappointed, and Mr. WILLIAM CASH, Jnr., briefly acknowledged this renewal of confidence.

VOTES OF THANKS.

Mr. S. O. STEPHENSON said he had pleasure in moving that the thanks of the meeting be given to the Chairman and Directors for their management of the business of the Company. It would be difficult to find, he said, a more efficiently managed Company than the British Gas Light Company, and the shareholders were fortunate in having a Chairman of such eminence and standing in the gas engineering world. It was no secret that he made a life's hobby of the control and running of this Company, which was fortunate for the shareholders and reflected itself in the position of the Undertaking to-day.

Mr. SLY seconded the vote of thanks, which was unanimously carried.

The CHAIRMAN, in response, said that everyone should have a hobby, and it was rather pleasant that one's work should be one's hobby. He hoped it would be a long time before he had to give it up; for this was a very pleasant Company to serve.

Continuing, the Chairman proposed a very hearty vote of thanks to the officials and workpeople of the Company. As he had said earlier in the proceedings, they could not succeed as they had succeeded unless everyone worked together. He was pleased to inform the stockholders that they had loyal and satisfied officials and workpeople, and that there was a happy and pleasant atmosphere throughout all their undertakings, while their Head Office was also a very pleasant place to work in. The Directors appreciated the good work which was done for them, and he wished officially to recognize that fact.

The DEPUTY-CHAIRMAN seconded the vote of thanks, which was supported by Captain W. J. LIBERTY and carried unanimously.

The SECRETARY briefly responded, saying it would be a very real pleasure to him to convey the vote of thanks to the staffs at Chief Office and the various stations. He knew they would be as appreciative as he was of this recognition of the work they had done during the past year.

This terminated the business of the meeting.

Gas Companies' Results in 1933.

Bridgwater.

The sale of gas by the Bridgwater Gas Light Company has again been well maintained and shows an increase of 3,249,700 c.ft. Attention is called to the fact that the Company was formed in 1834, and therefore the year 1934 is the Centenary year. It is proposed to extend the maintenance and renewal services now in operation. This will necessitate a considerable expenditure on account of revenue for the modernization of all apparatus on hire. The accounts show that after payment of income-tax, debenture interest, interim dividend, &c., and carrying £800 to the renewal fund, and £250 to the special purpose fund, there is a balance of £5,658. The Directors recommend the payment of a final dividend at 4%, less tax, making 7½% for the year. From the balance available they recommend that £1,100 be carried to the reserve fund, and the remaining balance carried forward to the next year's accounts.

Folkestone (S.E. Gas Corporation).

The sales of gas by the Folkestone Gas and Coke Company for the six months show an increase of 4·2%. The Company have been able to purchase coal at a lower price, the amount expended thereon showing a decrease which totalled £1,368. Repair and maintenance of works shows a reduction of £444, and the sum of £1,500 has again been written off in respect of the disused works at Hythe. The receipts for gas owing to the larger sale have increased by £1,804, while receipts from coke show a decrease of £712 due to slightly lower prices. The quantity of coke sold has been satisfactory and there is a large demand for the new Folkestone coke manufactured from dry-cleaned coal which is now entirely absorbed by the local market. The net revenue account shows that there is a total available balance of £22,933, out of which the Directors recommended the payment of a dividend at the rate of 7% per annum on the ordinary stock, less income-tax, which absorbs the sum of £7,681, leaving £15,252 to be carried forward to the credit of the current half-year. Sales of appliances have increased by 42%. During the half-year a further 170 consumers were connected up, making a total of 583 for the whole year.

"IDEAL HOME" EXHIBITION, OLYMPIA

The Heating Chamber of the "Bournemouth Daily Echo" Newspaper, showing the Boiler Plant for Panel Heating having an output of Two Million B.Th.U. per hour.

APRIL
3rd — 28th

A full display of Gas-Fired Plant for Central Heating and Hot Water Supply will be on view at our Stand No. 60, Ground Floor, Grand Hall, adjacent to the London Gas Exhibit, where a visit of inspection will be esteemed.

THOMAS POTTERTON (HEATING ENGINEERS), LTD.
CAVENDISH WORKS, RAVENSWOOD ROAD, BALHAM, LONDON, S.W.12.
Telephone: Balham 1244-5-6.
Telegrams: Potterton, Bal., London.

GAS MARKETS & MANUFACTURES

Stock Market Report.

[For Stock and Share List, see later page.]

The opening of the new Account brought with it a more cheerful atmosphere on the Stock Exchange last week. The steady buying of gilt-edged stocks continued and prices hardened, while industrials and home rails made a sharp recovery. Speculation in gold-mining shares broke out afresh, particularly in the shares of those companies in the development stage; oil shares on the other hand weakened on the lower price of the commodity.

Business in the Gas Market was well maintained, and several quotations went slightly higher. In some instances transactions were recorded at prices which justified further improvement in value though this did not materialize. A parcel of Southampton 4% debenture changed hands at 100, and the price rose 3 to 102½. The Bournemouth Company's stocks were in demand, and both the 6% preference and 3% debenture hardened 2 and the 4% debenture 1; while it will be seen in the Stock and Share List that several other stocks rose 1 or a fraction.

The South-Eastern Gas Corporation, which is controlled by the Gas Light and Coke Company, is seeking to extend its sphere of activities by an offer to acquire the whole of the issued ordinary capital of the Herne Bay Gas Company, Ltd. The shareholders of the Company are offered for each 20 £5 10% standard ordinary shares (£100 nominal value) either £220 in cash or 160 £1 ordinary and 10 £1 redeemable 4½% cumulative preference shares of the Corporation, and for each 20 £5 7% standard additional and new ordinary shares (£100 nominal value) either £154 in cash or 110 £1 ordinary and 10 £1 redeemable 4½% cumulative preference shares of the Corporation. At the time of writing a parcel of the £1 ordinary shares of the South-Eastern Gas Corporation is on offer at 28s. 6d., and the 4½% preference shares stand at round about 22s. 6d.

Current Sales of Gas Products.

The London Market for Tar Products.

LONDON, *March* 26.

There are no changes to report in the prices of tar products, which remain at about the following levels:

Pitch, 57s. 6d. per ton f.o.b.

Creosote, 3d. to 3¼d. per gallon.

Refined tar, 4d. to 4¼d. per gallon in bulk at makers' works.

Pure toluole, about 2s. 8d.; pure benzole, 1s. 10d. to 1s. 11d.; 95/160 solvent naphtha, about 1s. 9d.; and 90/140 pyridine bases, about 6s.—all per gallon naked at makers' works.

Tar Products in the Provinces.

March 26.

The average prices of gas-works products during the week were: Gas-works tar, 23s. to 28s. Pitch—East Coast, 56s. 3d. to 58s. 9d. f.o.b. West Coast—Manchester, Liverpool, Clyde, 56s. 3d. to 58s. 9d.* Toluole, naked, North, 2s. 1d. to 2s. 3d. Coal-tar crude naphtha, in bulk, North, 6½d. to 6¾d. Solvent naphtha, naked, North, 1s. 5d. to 1s. 6d. Heavy naphtha, North, 10d. to 11d. Creosote, *ex* works, in bulk, North, liquid and salty, 2⅝d. to 2⅞d.; low gravity, 2½d. to 2⅝d.; Scotland, 2½d. to 2¾d. Heavy oils, in bulk, North, 3⅜d. to 4¼d. Carbolic acid, 60's, 2s. 2d. to 2s. 3d. Naphthalene, £10 to £11. Salts, 55s. to 75s., bags included. Anthracene, "A" quality, 2½d. to 3d. per minimum 40%, purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *March* 24.

Values of all products are well maintained with the exception of refined tar, which has been marked down during the week.

Crude gas-works tar.—The actual value is 35s. to 37s. per ton *ex* works.

Pitch.—Export value is nominal at 50s. per ton f.o.b. Glasgow. In the home market, round 47s. 6d. per ton in bulk *ex* works is obtainable.

Refined tar.—Value of this is lower at 3d. to 3⅛d. per gallon *ex* works in buyers' packages.

Creosote oil.—Supplies being low, prices are well held. B.E.S.A. Specification is 4d. to 4½d. per gallon; low gravity, 4d. to 4¼d. per gallon; and neutral oil, 4d. to 4¼d. per gallon—all in bulk *ex* works.

Cresylic acid.—The market is rather quiet, but quotations are meantime unchanged. Pale, 97/99%, is 1s. 1d. to 1s. 2d. per gallon; dark, 97/99%, 11d. to 1s. per gallon; and pale, 99/100%, 1s. 4d. to 1s. 5d. per gallon—all f.o.r. in buyers' packages.

Crude naphtha.—Value is steady at 4¾d. to 5½d. per gallon, according to quality and quantity.

Solvent naphtha.—90/160 grade is 1s. 5d. to 1s. 5½d. per gallon, while 90/190 grade is 9d. to 10d. per gallon.

Motor benzole.—The reduction in petrol prices will affect this product, but, production being low, the value to-day is round 1s. 6d. to 1s. 7d. per gallon.

Pyridines.—90/160 grade is 4s. 6d. to 4s. 9d. per gallon, and 90/140 grade is 5s. to 5s. 3d. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s.	d.		s.	d.	
Crude benzole	0	9	to	0	9¼	per gallon at works
Motor ,,	1	4	,,	1	4½	,, ,, ,,
90% ,,	1	4½	,,	1	5	,, ,, ,,
Pure ,,	1	7½	,,	1	8	,, ,, ,,

Contracts Advertised To-Day.

Coal.

Wallasey Gas Department. [p. 834.]

Gasholder.

Middleton Gas Department. [p. 834.]

Trade Notes.

Industrial Gas Furnaces.

Messrs. British Furnaces, Ltd., have been granted by the Sheffield Gas Company a licence for the supply and manufacture under their patents of furnaces and atmosphere control apparatus.

New Capital Issues.

Andover Lighting and Power Company.—Tenders for the £15,000 of 5% preference stock recently offered by the Andover Lighting and Power Company were opened on March 22. The amount was over-subscribed, the average price of allotment being over £104.

Special Order Applications.

Morecambe and Heysham Corporation.

The Corporation are applying for an Order to authorize them to utilize scheduled lands for gas purposes, to extend the limits of supply so as to include the parish or township of Bolton-le-Sands, to empower them to borrow further money, and for other purposes.

Auckland (N.Z.) Gas Company, Ltd.

The Auckland Gas Company, Ltd., shows total receipts from the sale of gas and residuals, together with the balance of the various accounts, of £392,051. This sum is £13,337 less than the receipts of the previous year and represents a shrinkage of 3·28%. Actually the revenue from gas has declined by £1,829, a reduction of 0·52%, an amount which is not surprising in view of the general depression prevailing; revenue from the sale of residual products, coke, tar, and ammonia, is down by £9,654. Working expenses, excluding rates and taxes, have been reduced by £17,046. The payment of income-tax amounting to £30,075 is about the same as that of last year. The balance, after writing off the full amount allowed by the Income-Tax Department for depreciation, is £71,979. It is proposed to allocate £10,000 of this sum to the income-tax reserve account, to pay the same dividend as that of last year—*i.e.*, 5½% per annum, 2¾% of which was paid as an interim dividend, and to carry forward a balance of £105 to next year's account. During the year gas service pipes have been connected up with the premises of 432 additional consumers, bringing the total number up to 49,277; four miles of new mains have been laid, the total mileage being 677; 1,400 cookers have been installed, making a total number of 44,926 in use, and many additional gas-heated water storage systems have been added to the number previously in use.

STOCK AND SHARE LIST.

Official Quotations on the London and Provincial Stock Exchanges.

Issue. £	Share.	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations. Mar 24. (Provincial Exchanges Mar. 23.)	Rise or Fall on Week.	Transactions. Lowest and Highest Prices During the Week.
1,551,868	Stk.	Oct. 9	7	7	Alliance & Dublin Ord. ...	130–140	...	...
374,000	,,	Jan. 8	4	4	Do. 4 p.c. Deb. ...	90–100	...	...
557,655	,,	Mar. 5	7	7	Barnet Ord. 7 p.c.	165–170	...	169–170
300,000	1	Oct. 23	1/9⅔	1/4⅔	Bombay, Ltd	27/–29/-	...	28/-
178,480	Stk.	Feb 19	9½	9½	Bournemouth sliding scale	197–207	...	...
550,050	,,	,,	7	7	Do. 7 p.c. max. ...	163–167	...	166
439,160	,,	,,	6	6	Do. 6 p.c. Pref. ...	142–147	+2	144½
50,000	,,	Dec. 18	3	3	Do. 3 p.c. Deb. ...	77–82	+2	79½–81½
262,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	101–106	+1	103½–105
335,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	120–125	...	...
357,900	,,	Mar. 5	7½	7½	Brighton, &c , 6 p.c. Con ...	161–166	...	163
540,000	,,	,,	6⅔	6⅔	Do. 5 p.c. Con. ...	149–154	...	151½
195,500	,,	,,	6	6	Do. 6 p.c. B. Pref.	135–140	...	138½–140
1,487,500	,,	Mar. 5	5	5	Bristol 5 p.c. max.	115–116*a*	...	...
120,420	,,	Dec. 18	4	4	Do 1st 4 p.c. Deb. ...	101–103*a*	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	101–103*a*	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	120–123*a*	...	...
855,000	,,	Sept. 25	8	7	British Ord.	155–160	...	...
100,000	,,	Dec. 18	7	7	Do. 7 p.c. Pref.	153–158	...	...
350,000	,,	,,	5½	5½	Do. 5½ p.c. Pref.	106–111	...	...
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	95–100	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	107–112	...	...
160,000	,,	Jan. 8	5	5	Cambridge 5 p.c. Deb. ...	115–120	...	...
100,000	10	May 22	6	4	Cape Town, Ltd.	4⅜–5⅜	–½	5⅛
100,000	10	Nov 6	4½	4½	Do. 4½ p.c. Pref. ...	6⅜–7⅜	...	...
150,000	Stk.	Dec. 18	4½	4½	Do. 4½ p.c. Deb. ...	95–100	...	...
626,860	,,	Feb. 19	6	6	Cardiff Con. Ord.	126–131	+1	128½–129½
287,860	,,	Jan. 8	5	5	Do. 5 p.c. Red. Deb.	103–108	...	...
157,150	,,	Feb 19	5	6⅔	Chester 5 p.c. Ord.	112½–129½*b*	...	...
98,996	1	Oct. 9	2/-	2/-	Colombo, Ltd. Ord.	1⅞–1⅞	...	...
24,500	1	,,	1/4⅓	1/4⅓	Do. 7 p.c. Pref. ...	19/- –21/-	...	...
609,204	1	Mar 19	/11'48	/11'48	Colonial Gas Assn. Ltd. Ord.	1/16–1/16*	...	20/3
296,053	1	,,	1/8'80	1/8'80	Do. 8 p.c. Pref.	22/6–24/6*	–/6	25/-
1,775,005	Stk.	Feb. 19	5	6⅔	Commercial Ord.	120–125	...	122⅔
475,000	,,	Dec. 18	8	8	Do. 8 p.c. Deb. ...	76–81	...	77½–79½
286,344	,,	Mar. 5	5	5	Do. 5 p.c. Deb. ...	119–124	...	...
807,560	,,	Feb 19	7	7	Croydon sliding scale ...	151–156	...	155–156
569,590	,,	,,	5	5	Do. max. div.	103–108	...	107
620,395	,,	Jan. 8	5	5	Do. 5 p.c. Deb.... ...	120–125	...	...
542,270	,,	Mar. 5	7	10	Derby Con.	175–180*c*	...	...
55,000	,,	Jan. 8	4	4	Do. 4 p.c. Deb.	98–100*c*	...	...
209,000	,,	Feb 19	5	5	East Hull Ord. 5 p.c. ...	106–111	...	...
181,625	,,	Mar. 5	6	6	East Surrey Ord. 5 p.c. ...	126–131	...	129½
175,609	,,	Dec. 18	5	5	Do. 5 p.c. Deb. ...	115–120	...	120½
1,002,180	,,	Sept 25	17	15	European, Ltd.	125–135	...	125
19,342,763	,,	Feb 19	5⅝	5⅝	Gas Light & Coke 4 p.c. Ord.	25/6–26/6*f*	...	25/9–26/1½
2,600,000	,,	,,	3⅝	3⅝	Do. 3½ p.c. max. ...	87–90	...	87½–88½
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	103–106	+1	104–105
6,109,497	,,	Dec. 18	3	3	Do. 3 p.c. Con. Deb. ...	83–86	...	85½
3,649,770	,,	,,	5	5	Do 5 p.c Red. Deb. ...	116–119	+1	118–118½
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	113–116	...	114½
270,466	,,	Mar. 5	6	6	Harrogate New Cons. ...	125–130	...	...
82,500	,,	Mar 5	7	7	Hastings & St. L. 5 p.c. Conv.	147–152	...	...
258,740	,,	,,	5½	5½	Do. 3½ p c. Conv.	115–120	...	...
140,000	1	Oct. 9	†10	1/7½	Hongkong & China, Ltd. ...	29/- –32/-	...	...
218,200	Stk.	Mar. 5	6	6	Hornsey Con. 3½ p.c. ...	128 133	...	...
5,600,000	,,	Nov. 6	14	10	Imperial Continental Cap.	205–210	+1	204½–207½
223,190	,,	Feb. 5	3½	3½	Do. 3½ p.c. Red Deb.	89–94	...	...
235,242	,,	Mar. 5	8½	8½	Lea Bridge 5 p.c. Ord. ...	169 174	...	...
2,167,410	,,	Mar. 5	6	6	Liverpool 5 p.c. Ord. ...	129½–131½*b*	...	...
245,500	,,	Dec. 18	5	5	Do 5 p c. Red. Pref. ...	101–111*	...	...
306,083	,,	July 17	4	4	Do. 4 p.c. Deb. ...	101½–103½*b*	...	...
165,786	,,	Feb 19	8	10	Maidstone 5 p.c. Cap. ..	180–190	...	...
56,176	,,	Jan. 8	3	3	Do. 3 p.c. Deb. ...	72–77	...	...
75,000	5	Dec. 4	†10	†10	Malta & Mediterranean ...	9–11	...	...
392,000	–	Oct. 2	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb.	98–103	...	...
231,978	Stk.	Feb. 19	5	5	M. S. Utility "C." Cons. ...	113–118	...	...
818,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	95–100	...	99–99½
360,075	,,	Jan. 8	4	4	Do. 4 p.c. Deb. ...	100–105	...	...
148,955	,,	,,	5	†5	Do. 5 p.c. Deb. ...	117–122	...	...
675,000	,,	21 May '31	16	6	Montevideo, Ltd.	60 70	...	...
2,061,315	,,	Mar. 5	5	5⅔	Newcastle & Gateshead Con.	25/6–26/-*d*	...	...
682,886	,,	,,	4	4	Do. 4 p.c. Pref. ...	99–101*d*	+½	...
776,706	,,	Jan. 8	3½	3½	Do. 3½ p.c. Deb. ...	90⅔–91⅔*d*	...	...
277,285	,,	Nov 6	5	5	Do. 5 p.c. Deb. '43 ...	105–107*d*	...	...
274,000	,,	Feb. 19	5	5	Newport (Mon.) 5 p.c. max.	103–105*a*	+1	...
204,940	,,	Mar. 19	7½	7½	North Middlesex 6 p c. Con.	155–160*	–2	...
396,160	,,	Feb. 5	5	5	Northampton 5 p.c. max. ...	99–104	...	...
300,000	,,	Dec. 4	7	†9	Oriental, Ltd.	147–152	...	150–151½
316,617	,,	Dec. 18	8	8	Plym'th & Stonehouse 5 p.c.	165–170	...	166
504,416	,,	Feb. 19	8	8	Portsm'th Con Stk. 4 p.c. Std	168–173	...	172
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	105–110	...	...
114,000	,,	Feb. 19	5	5	Preston 5 p.c. Pref.	103–108	...	...
686,312	,,	Jan. 22	4	4	Primitiva 4 p.c. Rd. Db. 1911	87–92	...	...
389,813	,,	Dec. 18	4	4	Do. 4 p.c. Cons. Deb.	88–93	...	...
150,000	10	Mar. 19	6	6	San Paulo 6 p.c. Pref. ...	6–7*	–½	...
1,736,968	Stk.	Sept. 11	6	6	Sheffield Cons.	135–137*e*	...	...
95,000	,,	Jan. 8	4	4	Do. 4 p.c. Deb.	94–98*e*	...	...
133,201	,,	Feb. 19	5	5	Shrewsbury 5 p.c. Ord. ...	135–140	...	...
90,000	10	June 12	15	14	South African	8–5	...	...
6,709,895	Stk.	Feb. 19	6	7	South Met. Ord.	131–134	...	130–132½
1,135,812	,,	,,	6	6	Do. 6 p c. Irred. Pf.	138–143	...	140
850,000	,,	,,	4	4	Do. 4 p.c. Irred. Pf.	101–105	...	104½–104½
1,895,445	,,	Jan. 8	3	3	Do. 3 p.c. Deb ...	82–85	...	85½–85½
1 000,000	,,	Jan. 22	5	5	Do. 5 p.c. Red. Deb.	111–115	...	...
209,820	,,	Mar. 5	5½	5½	South Shields Con.	166–167*d*	...	...
1,543,795	,,	Feb. 19	6	6	South Suburban Ord. 5 p.c.	129–134	...	131–131½
512,825	,,	,,	5	5	Do. 5 p.c. Pref.	114–119	...	116–118
300,000	,,	,,	–	4	Do. 4 p.c. Pref.	99–102	...	...
868,837	,,	Dec. 18	5	5	Do. 5 p.c. Deb.	120–125	...	...
100,000	,,	,,	4	4	Do. 4 p.c. Deb.	100–103	...	...
647,740	,,	Mar. 5	5	5	Southampt'n Ord. 5 p.c. max.	109–114	...	...
121,275	,,	Dec. 18	4	4	Do. 4 p.c. Deb.	100–105	+3	100
350,000	,,	Mar. 5	5⅓	5⅓	Swansea 5½ p.c. Red. Pref.	106–111	...	108
200,000	,,	Dec. 18	6⅔	6⅔	Do. 6⅔ p.c. Red. Deb.	103–108	...	...
1,076,490	,,	Mar. 5	6⅔	6⅔	Tottenham and District Ord.	148–153	...	151
409,835	,,	,,	5⅔	5⅔	Do. 5⅔ p.c. Pref. ...	123–128	...	...
62,235	,,	,,	5	5	Do. 5 p.c. Pref. ...	110–115	...	...
199,005	,,	Dec. 18	4	4	Do. 4 p.c. Deb. ...	97–102	...	...
85,701	,,	Oct. 9	6	6	Tuscan, Ltd. 6 p c. Red. Db.	90–100	...	...
349,110	,,	Mar. 5	7	7	Uxbridge, &c., 5 p.c. ...	147–152	...	...
88,330	,,	,,	5	5	Do. 5 p.c. Pref. ...	110–115	...	...
1,322,220	,,	Mar. 5	7	7	Wandsworth Consolidated	155–160	...	158½–158
1,096,378	,,	,,	5	5	Do. 5 p.c. Pref.	117–122	...	119–120½
1,317,964	,,	Dec. 18	5	5	Do. 5 p.c. Deb.	120–125	...	...
158,400	,,	Mar. 5	5	6*g*	Winchester W. & G. 5 p.c. Con	115–120	...	...

Quotations at:—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. *f.*—The quotation is per £1 of stock. *g.*—Paid £8, including 10s. on account of back dividends. * Ex. div. † Paid free of income-tax. ‡ For year. Hongkong & China, Ltd.—paid on £10 shares.

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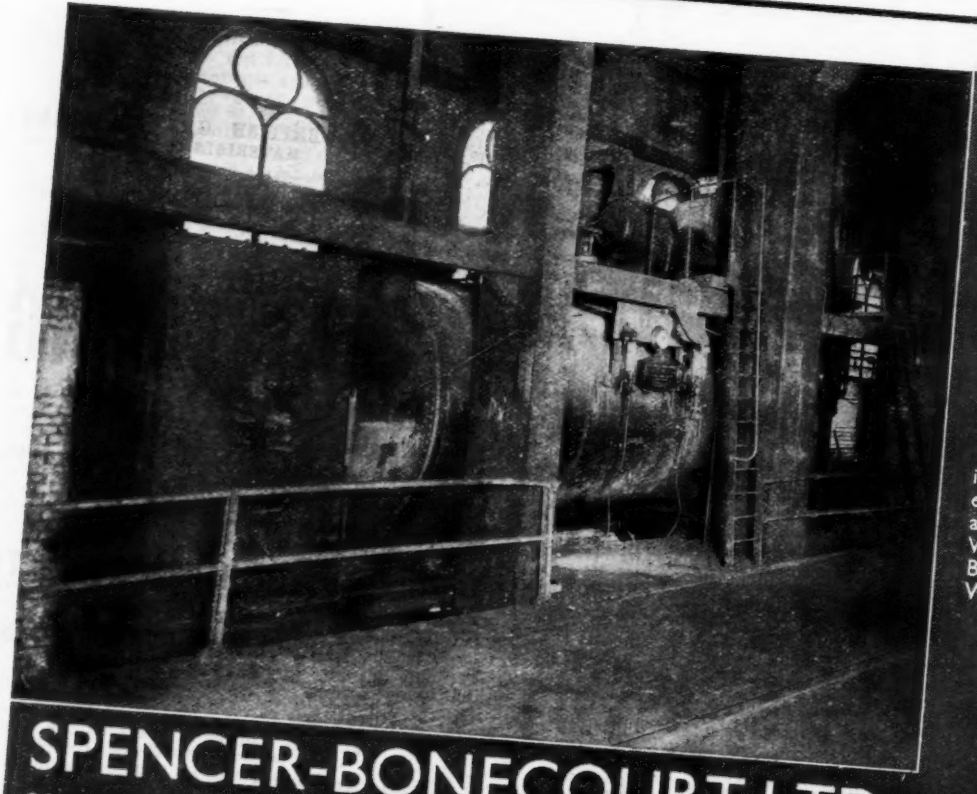

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